

AVIATION WEEK

JAN. 12, 1953

50 CENTS

A MCGRAW-HILL PUBLICATION

NEW GUARDIAN OF THE NORTH

HERE'S the newest jet designed for defense of the western world.

She's an all-Canadian fighter called the AVRO CF-100.

The big all-weather ship will soon be guarding the polar routes. Powered by two Orenda engines built in Canada, the CF-100 can do well over 600 m.p.h.

The Honeywell pilot engineer you see here climbing aboard this test model of the CF-100, pictured outside the Honeywell hangar in Minneapolis, is about to check the ship's Honeywell Control installations. These include a yaw axis damper system, a complete fuel measurement system with a new totalizing feature, and a classified temperature indicating system that is used in the CF-100's rocket armament.

Moreover, test installations of Honeywell's new E-11 jet fighter autopilot are now being made.

The CF-100 is another example of how Honeywell works with airframe manufacturers—both U. S. and Canadian—to produce better airplanes. We shall continue to provide this kind of cooperation—because *automatic control* is such an important part of aviation progress. And *automatic control* is Honeywell's business.



MINNEAPOLIS
Honeywell

Aeronautical Controls

18105



RESEARCH HATCHED THIS BUTTERFLY!

Out of Hydro-Aire's Research Laboratory, one of the finest in the nation, constantly come new and improved hot-air valves of many types—solenoid pilot valves—pneumatically operated valves—motor operated butterfly valves.

The fact that Hydro-Aire's butterfly valves, like all Hydro-Aire products, fly directly from the drafting board to the research chamber is but another reason why every fighter, every bomber, every transport is Hydro-Aire equipped. It is the sign of dependability—proved engineering and proved products, backed by one of America's most efficient production organizations.

HYDRO-AIRE
BURBANK, CALIFORNIA
Subsidiary of Crane Co.



B.F. Goodrich



B-52's bicycle gear uses B.F. Goodrich wheels, brakes

TAKING THE HEAT ON THE B-52 Strato-Lifter is now in being in early use of the U. S. Air Force's largest bomber. Having decided upon right wheels is a bicycle arrangement. The same B. F. Goodrich 50,000 lb. wheel proved on the B-47 is used. The wheel has tires that look up to 500,000 lb.

B. F. Goodrich Bender Tube brakes have a new kind of brake block. No rivets are used. The brake lining is cemented onto a light magnesium shoe. The braking action applies equal pressure over the full circle of the drum to give greater power, to distribute the load better. The air-

caving expander tube gives more braking pressure with less heat.

Landings are safer and smoother. BFG's brakes respond sensitively and quickly to maximum pressure, take emergency overloads better, cannot lock or grab. And they last longer because most of the brake lining is used. Illustration of rivet pattern full, positive braking down almost to the wheel backing.

The B. F. Goodrich Type VII turn axle 178 lb. solution, yet so light so weight. All nylon cord construction increases tire life, reduces maintenance. (Black and white markings on tire

pictured above are for photographic determination of speed calculations.)

Other aviation products in store from BFG's research and engineering include bonded rubber, paracord and electric De-Luxe, inflatable tanks, Avionics, Pressure Sealing Zippers, Hasebrook solenoids, fuel cells, Kerosene, accessories. The B. F. Goodrich Co., Akron, Ohio.

B.F. Goodrich
FIRST IN RUBBER



Proven Accuracy for the Aviation Industry

Sier-Bath PRECISION GEARS

PROVEN BY TEST...

...on the latest gear checking equipment. Red Laser charts (left), Lead Measuring charts and Involutes

Tooth Form charts prove the accuracy of Sier-Bath Aircraft Quality Gears before they leave the plant.

PROVEN BY USE...



Westinghouse J34
Jet Engine

...in many of today's leading aircraft. For example, Sier-Bath supplies gear components for the famous Westinghouse J34 Jet Engine... which powers the two modern McDonnell Aircraft Corporation planes shown at left.

McDonnell XP-56 "Venom"



Founded 1902

Member A O A A

Sier-Bath GEAR and PUMP CO., Inc.

212 Hudson Boulevard, North Bergen, N. J.

Also manufacturers of Screw and "Blacked" Rotary Pumps, and Flexible Gear Couplings



McDonnell F2H-3 "Beebee"

NEWS DIGEST

Domestic

Strategic Air Command set a new flying safety record in 1952-53 plane accidents per 100,000 hr. flown, a 49% decrease over the 1951 rate. The new mark was achieved despite a 17% increase in flying time last year.

U. S. has lost 1,685 planes in Korea since start of hostilities until Dec. 1, 1952. USAF, Navy and Marine Corps records disclose. Air Force lost 579 jet planes and 333 piston types and charts destruction of 600 enemy aircraft. Navy and Marines lost 1,035 planes while destroying 92 Communist aircraft during the same period.

Harry Whitcomb, Davis, Calif., has been elected president of the Flying Parents, Inc. of Calif. for 1953. Forrest Farnes, of Turlock, was named vice president and Bert Nitz, Winters, was elected immediate treasurer.

Series of cowboy work stoppages is being considered at Boeing Airplane Co.'s Seattle and Renton, Wash., plants by members of South Puget Sound Engineering Employees' Assn. to strengthen demands for a new contract. Boeing has offered a 6% wage increase and around overtime schedules but the association has rejected the plan, reportedly because overtime penalties would not be retroactive. The engineers' old contract expired July 1.

Cessna 340 production has been accelerated to up 1953 delivery schedules to eight planes monthly. The San Diego firm delivered 31 340s in 1952. Viewed the end of 1953, a 35% increase in T-29 production is planned. New models planned are the T-28C, a single-engine trainer with a new type P&WA R2300 engine and the T-29D, a four-engine trainer. First turboprop-powered B37 flying boat is scheduled for delivery late this year.

Robert Roosevelt resigned as chairman of Civil Service Commission Dec. 18. Washington observers say the former House Democratic Whip and ATA executive vice president is assumed a top job with Eastern Air Lines if he accepts it. Eastern president E. V. Rulifson has temporarily withdrawn from ATA but says because the division offered to appoint Roosevelt to succeed E. S. Land as ATA president. Roosevelt launched last month with Eastern vice president Leslie F. Arnold in Washington.



NEW PRESIDENT of the American Association of Manufacturers, Ann. L. W. Toss (right) receives the gold of his new office from retiring ADMA president George W. Blaine of Southwest Airlines Co., Dallas, Tex. Toss is with Seattle Magneto Division of Bendix Aviation Corp., Seattle.

Charles F. Wells, Jr., Roske, L. J., N. Y., has been chosen to be general assistant to Sherman Adams of New Hampshire, assistant to President-elect Eisenhower in the new administration. Wells' extensive aviation experience in clothes wearing Boeing cargo aircraft, Wells Air Service, and operations at Wells-Kerr Corp., airline service firm.

Financial

Pacific Airservice Corp., Burbank, Calif., reported consolidated sales for the third quarter ended Nov. 30 at \$27.5 million, a 14.88% increase over 1951. Consolidated sales for the 1952 period topped \$83.4 million.

Northwest Airlines has declared a regular quarterly dividend of 20¢ (one per share) on its 1.6% cumulative preferred stock, payable Feb. 1 to holders of record on Jan. 28. NWA has paid an \$875,000 dividend on a bank loan due Apr. 1, reducing its borrowings to \$6,000,000. Carrier's net for November profit was \$550,441 after \$405,579 credit on prior expense accruals.

International

Aer Lingus DC-3 crashed near Summit, Ark., England, while attempting a forced landing in poor visibility with both engines dead. The 75 aboard are expected to survive.

British Overseas Airways Corp. has

N. E. Locking as an ADMA was president Lawrence R. Zippert (left) of General Aircraft Supply Co., Detroit and James Biddle, National Aeronautical Radio Corp., Austin, Tex. Elections were held during the association's 10th annual meeting at Silver Beach, Fla.

offered to let Qantas Express Airways, Australia, purchase six of the 26 Bristol Britannia turboprop engines BOAC has on order. The offer would permit Qantas to get the Britannias at least a year sooner than if it took its normal place on the delivery list. The move is believed to be an effort by BOAC to speed up British "round the world" jet air carrier.

British Overseas Airways Corp., Victoria Village, had a banner year while negotiating for a landing at Belfast, Northern Ireland, for 5, holding approximately 27 of the 35 aboard.

"Super priority" rating has been given to British Ministry of Supply to production of DRI Council jet transport and Vickers Viscount and Bristol Britannia turboprop engines to speed deliveries and... action forcing operators to change over to British types. "Millions" of copies having the same production rating as English Electric Canberra, two Marks of the Hawker Hunter, Gloster Javelin, Supermarine Spitfire, Vickers Valiant, F4U Corsair, Avro Vulcan and Handley Page D. H. 10.

KLM Royal Dutch Airlines C-54 crashed 20 mi. north of Dabrunn as was, Sank, Austria, but all 56 passengers and 30 crew members were unharmed. Rescue was handled by USAF's Military Air Transport Service. Plane apparently was forced down by lack of fuel.

Jato Release on Republic's F-84 AIRBORNE Actuated



The F-84's auxiliary (X-420 type) jato (jet-assisted takeoff) system is shown in the photo above.

This company of Republic's Model X-420 actuator shows the extremely adjustable piston stroke which, in conjunction with torque limiting switches, provide accurate positioning in both extension of travel. The load may be at any value to 275°.

Proportion of the upward output shaft, on both sides of the actuator, helps reduce the model X-420 in any application. The weight of the unit, with main motor (1000 to 275 pounds) is 275 pounds. The speed, at 275 psi, is 250 pounds per inch load, in 1 psi.

See our insert in the IAS Aero magazine Engineering Catalog for details on this and other Airborne actuators.

AIRBORNE
ACTUATORS CORPORATION
104 General Avenue, New York, New York

AVIATION CALENDAR

- Jan. 22-23—Midwinter conference of American Management Assn., Hotel Statler, Los Angeles.
- Jan. 22-26—Normal meeting and engineering display of Society of Automotive Engineers, Sheraton Cadillac Hotel, Detroit.
- Jan. 25-26-27-28—Institute of Industrial Transportation and Traffic Management, American University, Washington, D. C.
- Jan. 24-25-26-27-28—AIAA Conference on High Performance Motors, Statler Hotel, Washington, D. C.
- Jan. 25-26-27-28—Illinois Canton Space Operations Training School, University of Illinois, Urbana, Ill.
- Jan. 24-25—Flight Maintenance Conference, Public Auditorium, Cleveland, O.
- Jan. 24-25—Winter general meeting of the American Institute of Electrical Engineers, Hotel Statler, New York, N. Y.
- Jan. 25—National Fire Protection Association Convention on Fire Protection, Hotel Statler, New York, N. Y.
- Jan. 26-27-28—Annual Meeting of Institute of Aeronautical Sciences, Hotel Statler, New York, N. Y.
- Feb. 10—Annual meeting of industrial labor union representing, American Society of Mechanical Engineers, Sheraton Statler Hotel, Philadelphia.
- Feb. 12-13—National Aviation Education Council annual meeting, Atlantic City, N. J.
- Feb. 15—New York Section of the International Society of America, Hotel Statler, New York, N. Y.
- Feb. 15-16—High Speed Annual Conference of the Society of Physics Industry, New Bedford, New Bedford, Massachusetts.
- Mar. 10-11—General Annual Conference, Society of the Plastics Industry, Canada, Inc., Grand Rock Hotel, Niagara Falls, Canada.
- Mar. 22-23—National Production Plastics of the SAE, Hotel Statler, Cleveland, O.
- Mar. 23-Apr. 2—First International Magnetron Exposition, National Central Assembly, Washington, D. C.
- Apr. 1-2—Second Annual International Motor Sports Show, Grand Central Palace, New York, N. Y.
- Apr. 20-23—Aerometric Production Forum, National Aerometric Meeting and Aircraft Engineering Display (NAE), Hotel Statler, New York, N. Y.
- May 11-12—IAE National Conference on Airborne Electronics, Statler Hotel, Detroit, O.
- May 14-15—14th National Aircraft Handling Exposition, Convention Hall, Philadelphia.
- June 5-12—Second International Aviation Trade Show, Hotel Statler, New York, N. Y.
- Sept. 7-11-1955 SNAE Convention Year Flying Display, Farmborough, Hampshire.

PICTURE CREDITS

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Contains dimensions, specifications,
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Describes types and sizes of
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dimensional data for determining
minimum HI-SHEAR rivet clearances.

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LOS ANGELES, CALIF.



North American Fury Tries Its Sea Wings



BEING REPAIRED—The two XF2U Furies, one still parked on the Coast Guard's auxiliary aircraft (10), being prepared for flight by their plane handlers.

ENDING—A type dock receiving boat (10) is guided by leading officer into landing on the carrier.

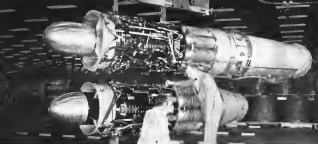


TOWING A FURY—Dock master (10) is XF2U off the aircraft which has just landed the plane in dock land. Above and below the Fury is a P-400 (10) in the air.

HOOKED—XF2U has been hooked by engaged meeting wire. Note hook master across the deck at front of plane.



RECAPITULATED—Revised photo (left) captures a North American XF2U Fury being conducted off the USS Coast Guard. Note wheel is over the edge of the big carrier's deck. Revised (right) again shows the Fury being conducted off the USS Coast Guard. This and the photos below were taken during carrier operations trials of two XF2Us from the Naval Air Test Center, Patuxent, Md. The Navy's Fury is a carrier in the USN F-84 Sabre but has folding wings and four 20mm cannons in place of Sabre's six 12mm machine guns. Production Furies are being tested out at Columbus, Ohio.



GE J47 is shown with afterburner and without. Even without afterburner, the engine develops over 14,000 pounds of thrust.

G-E J47 Powers USAF Planes to Two Speed Records

North American F-86D Sets New World Mark, Boeing B-47 Shatters Honolulu-San Francisco Record

Still helping to write the aviation record book, General Electric's J47 turbojet powered a North American F-86D Sabre and a Boeing B-47 to new speed records within the space of one week. Making that low-level pass on the three kilometer Salton Sea, California course, the F-86D (with afterburner) racked up an average speed of 699.9 mph—a new world's speed record. Just a few days later, a single Boeing B-47 (without afterburner) set an unofficial record for the Honolulu-San Francisco run of 4 hours, 32 minutes.

The F-86D and B-47 engines are first cousins to the J47's which power the Sabre in Korea. The afterburner version is equipped with all electronic control which automatically regulates fuel through both the engine and the jet exit cone. This means optimum performance under all conditions with much less pilot attention.

Designed and built by General Electric, the world's largest engine manufacturer of jet engines, the J47 is rated peak performance by G.E.'s world-wide service engineering organization. This group provides on-the-spot technical assistance and supervision to users of the J47 no matter where they may be.

Top in speed at home, top in combat performance abroad, the J47 is America's top-made produced jet engine. General Electric Company, Schenectady 5, N. Y.

You can put your confidence in...

GENERAL ELECTRIC



RECORD RUN of F-86D was made under rules of the Fédération Aéronautique Internationale and the N.A.A.U. Average speed 679.5.

WHO'S WHERE

In the Front Office

Ralph L. Collett has been appointed vice president and assistant general manager of Kaiser Metal Products' Aircraft Division, Portland, Ore., responsible producing landing sections for Republic F-84F and Martin B-12V. Collett worked with Kaiser in 1942. William E. Judd has been designated in assistant to the president of Boeing-Warren, Chicago. He succeeds Laurence L. Rohls, promoted last year to worldwide sales chief of S.W. International and Alameda Industries equipment. William V. Ryan succeeds Judd as general sales manager. South West Air. William H. Kleins Jr. has joined Packard Motor Car Co. as assistant to vice president in charge of defense operations. Detroit. Kinzie Kennedy was general sales manager of Consolidated Vultee Aircraft Corp.'s Stinson Division and W. L. Vernon Corp., N. Y. C.

Changes

Emory W. Winkler has been named ad executive assistant of California Central Airlines' traffic and general, Lockheed Air Terminal, Burbank. Frank W. Davis has been appointed to the staff of Consolidated Vultee Aircraft Corp.'s vice president for engineering, San Diego Division. He succeeds one General's assistant chief engineer for research and development.

Edith E. Thibault has been promoted from chief pilot to flight operations manager of Philippine Air Lines. George Scott, commercial aviation pilot, has been named assistant to Royal International Airways' general traffic and sales manager.

George H. Wurdell has joined Southwest Airlines as sales, communications director. Gordon E. Marshall has been appointed manager of Pan American World Service Pacific Alaska Division.

C. W. Mizumi is a new field engineer for Weller Aircraft Corp.'s product development department at Burbank, Calif.

John V. Roberts has joined Short Bros. & Howard, Ltd., as assistant helicopter designer at the Hellett, No. 10, Bedford, plant.

Jorge De Regado has been promoted to European (civil) operations for Aeromex, Colombian National Airways.

Honors and Elections

Vere Allen, Emory S. Land has been re-elected president of the Air Transport Association. NTA officers served since Milton W. Arnold, vice president of operations and engineering. I. D. Denard, secretary. Stuart Tipton, general counsel, and J. E. Hunter, vice treasurer. New members of the 11-man board of directors: T. E. Rosoff, Eastern Airways, John B. Connelly, Southwestern Airways, and Robert F. Ray, Continental Air Lines.

Wesley Lee Fierman, board chairman of Trans World Airlines, is beginning a two-year term as chairman of the U.S. Council of the International Chamber of Commerce.

INDUSTRY OBSERVER

► A Fairchild C-119 climbed to 33,300 ft. with a gross weight of 55,900 lb. in a recent flight near Hagerstown, Md. That is well above the cargo transport's normal ceiling of 27,300 ft. Lt. Col. E. S. Cleveland, USAF (Ret.) representative who piloted the plane to check performance of fueling and oxygen equipment, and the C-119's flight characteristics were quite satisfactory at the above-normal level.

► Cessna Aircraft's turbine-powered L-19B liaison plane is set for a 34th anniversary of engine and plane performance by Air Force test pilot at Wichita. The pilot will test mainly characteristics of the L-19B's Boeing 502-B outboard in flight, cruising and fuel flow.

► Advocates of the convertiplane and compound helicopter say a Piasecki PA-44 Autoplane 10 years ago reached a speed of 148 mph—better than the world's speed record for subrotated helicopter flight.

► Bell Aircraft designates its forthcoming convertiplane in the USAF-Army evaluation as the Bell Model 206. The Sikorsky convertiplane entry in the same evaluation is called Sikorsky Model S-57.

► Post & Whitney Aircraft reports that it expects to turn out about half its 1953 production in gas turbine engines. First two aircraft scheduled to fly with the F&W PA-44 turboprop, the Douglas EC-128B and the Lockheed RV-3, are not expected to fly until late in 1953.

► Douglas Aircraft is developing a new supersonic carrier-based bomber to succeed the A-3B.

► Army is about to sign a contract for 40 new Beech T-34B Bonanzas to follow deliveries of the first 35 production planes now on order. First of the Army's original order is due for delivery this month.

► First B-47 Stratojet built by Douglas under a second-source contract flew at Tulsa during the holidays, two days before the first flight of Lockheed's B-47 at Monterey, Cal. Douglas and Lockheed both hold options to manufacture the Boeing-designed bomber.

► Avco Canada's new CP 100 Mark 4 night fighter—which broke through the sound barrier in tests last month—is described in agreement to the Mark 3 as agile, precise, equipment, maintainability and handling. The new Canadair jet is scheduled for production this summer.

► Engine and flight tests are starting on the B-47 Stratojet's new swiveling bicycle gear for crosswind landing, according to reports from Wichita. Test technicians, chief Boeing test pilot, is in the cockpit. The landing gear is believed to be the last swiveling double-track bicycle undercarriage to be developed. Outriggers which at the wingtip have always been retained.

► USAF has begun a new series of study contracts with the aircraft industry to re-evaluate the industrial capacity required to meet Air Force's current mobilization requirements. Purpose is to get more reliable data than the hurried over-estimates of the 1950 Korea contingency period. Various segments of the aircraft industry will be studied in the study which match their respective production peaks. Few contracts already have been let with manufacturers of aviation equipment.

► MATS expects to get initial deliveries of the C-131, a combination cargo and air evacuation version of the C-47, during the first quarter of 1954. The C-131 will be equipped with forward-facing seats and will be for domestic operations of MATS in evacuation.

► Pausack Helicopter Corp. is choosing a new tail rotor site for its H-31 helicopter as a result of a recent flight carrying 14 passengers plus pilot on a 10-minute run from the Philadelphia Airport to the pier at Morristown, Pa. Pausack claims that is the largest passenger load carried internally by any helicopter on a point-to-point flight.

Washington Roundup

The Case of Aero, Inc.

A key question now at for decision early in the new Congress is whether Aero, Inc., will continue to operate the Air Force's multi-million-dollar Arnold Engineering Development Center at Tullahoma, Tenn.

■ Congress tentatively has said "No." The military budget for the 1953 fiscal year, which ends next July 1, lists no payment to the corporation after May 31 unless Congress should have directed otherwise. "A notice to lay persons to Aero was modified, largely at USAF pleading, that this would not allow time for transition to other management."

■ Both Aero, Air Force and Aero are determined to fight. ■ Describing the corporation's revenue, USAF notes of Aero's contract Sept. 30, explaining it wants "to protect this matter to the Congress." (After long hearings before two committees and long debates on the floor of both House and Senate, Congress came up with its directive against Aero.)

■ Aero's determination to keep the USAF contract for operation of AEDC is evidenced by its retention of the politically influential law firm, Arnold, Forster and Porter.

Windfall for Stockholders?

The least of congressional opposition belief that Aero has been the reason for a handful of stockholders to earn a fabulous return on investment for 1950 is no contribution to its operation. The stockholders

Steeding & Pusey, including St. Louis engineering firm Aero incorporated by S&P as a wholly owned subsidiary, capitalized at \$108,000 for the purpose of operating AEDC. Street Birmingham, former St. Louis business executive and now resident from Missouri, awarded Aero the operation contract when he was Air Force Secretary. At the request of former Undersecretary for Air John McCone, Aero's representation was expanded to \$110,000, to include:

■ Stephen Steeding, a friend of McCone's from college days and his partner in several business enterprises, who, members of his family, assembled a total of \$10,000.

■ David R. Colburn, Jr., director at Emerson Electric Co. (of which Birmingham was president and chairman of the board before moving to Woodward), who subscribed \$55,000. Also president and director of St. Louis Union Trust Co. and director of Union Electric Co., Colburn described himself to investigators as "a good friend of Mr. Steeding."

■ E. Walker McCone, president of Union Electric and director of St. Louis Trust Co., who, with members of his family, subscribed \$15,000.

The return on the \$170,000 investment of these stockholders:

■ \$25,474 for the period of the first Aero contract, from Oct. 32, 1950, to Oct. 1, 1951

■ \$95,000 for the period of the second contract, from Oct. 1, 1951, to Oct. 1, 1952.

"This amounts to more than \$110,000—or a return of nearly 50% on less than two years."

USAF and Aero have protested the giving of Aero's return as relative to capital investment. Instead it is maintained, it should be considered as similar to a yield on:

Contract Accounting Office doesn't go along with this reasoning.

Mr. Gen. F. D. Canoll, former commanding officer of AEDC, told investigators the stockholders, other than Steeding & Pusey, "contributed nothing to the operation of AEDC" to his knowledge.

Other Objections

Congressmen also object that:

■ Aero's fees are geared to its operating budget (\$374,500 under the first contract and \$1.6 million under the second), meaning that the higher the cost the higher the fee. By 1953, it is estimated the operating budget for AEDC will approximate \$10 million. At the present rate of Aero's fees, this would mean an annual fee for the firm of \$10,000,000 a year, or a return of some 50% annually on its investment.

■ One of Aero's major sales at present is its sale of S&P designs for AEDC facilities. S&P is under contract to design the facility, and the question whether Aero, through owned by S&P, can properly claim that performance.

Top Lights

Key personnel figuring in the Aero issue are:

■ Sen. Steeding, Ohioan, a congressman from Ohio. AEDC is operated by a non-profit corporation formed especially for the purpose, he is usually called as a "non-profit" agency by Air Force. Reorganization of a committee of experts, headed by Prof. John M. Williams of Massachusetts Institute of Technology, was submitted to Senate Sept. 12, 1953. Three days later Aero was incorporated, and on Apr. 21 USAF got the first test flight contract.

■ Sen. Albert Gore, as a member of the House, campaigning for the Senate, he launched the attack on Aero which resulted in the congressional loss on payments to the firm. Since the outbreak, the Tennessee senator has played down Steeding's participation. It is suggested now he would prefer to keep out of the Aero issue.

■ Sen. Lee Harvey DeLoach of Tennessee for USAF. DeLoach is cited whether Aero's authorization was by S&P in view of production of a sales revenue from \$17,500 at the time of the first contract. He is cited as a special interest, reflecting the intent of USAF's contract to Air Research as completion. General Accounting Office staff noted that S&P "did not approach" USAF. On continuing congressional "attacks, the latter is still with the Department of Air Force."

■ Dan Kinshel, secretary of Aero. During its months, CAGI noted that, as Assistant Secretary of Navy in 1950, he resolved Navy's objection to "significant design changes" at AEDC. After Aero's incorporation, CAGI was approached to participate in Aero by S&P representation. Kinshel is 10% owned by General Tire and Rubber Co., of which Kinshel formerly was vice president, according to CAGI.

■ Rep. Dewey Short. The Tennessee congressman, Aero's leading personal or Capital Hill critic, has become chairman of the House Armed Services Committee, with jurisdiction over the Aero matter. He had announced last week he would take the Aero on Air physics.

—Kathleen Johnson

AIRCRAFT WEEK

Two-Year Aircraft Sales Boom Predicted

- Defense Mobilizer says deliveries of military planes to reach peak of 12 million lb. per month in 1954.
- Aircraft industry production already four times the pre-Korea output, despite bottlenecks in program.

By Robert Hertz

Sales volume of the aircraft industry will continue to rise during the next two years. That is the significant conclusion to be drawn from a report by Defense Mobilizer Thayer J. Fowler.

He said the monthly total of aircraft weight delivered will increase steadily until the end of 1954, despite the fact that aircraft deliveries will reach their seasonal peak this spring.

This steady increase in aircraft weight is accounted for by the predominance of heavy, expensive transport and fighter aircraft in delivery during the next two years in contrast to lighter and less expensive fighter types that now comprise the bulk of aircraft deliveries. Aircraft weight is a more accurate measure of air volume than number of aircraft.

Fowler noted in his rights quarterly report to President Truman that the aircraft industry has averaged nearly 1,000 a month by the end of 1952.

Industry observers estimate the deliveries will reach a monthly output of about 9 million aircraft pounds. National deliveries are expected to be about 1,000 planes a month this spring, but national weight will continue to rise more than 25% to a peak of about 12 million lb. a month in 1954.

■ **Production Surge.** Total aircraft production has increased to four times the pre-Korea rate of mid-1950, and deliveries of jet aircraft have increased fivefold during the past two and a half years, Fowler stated. In the following categories, he said, new aircraft, and the value of aircraft and electronic equipment produced is about eight times that of the pre-Korea level.

Ship jet engines and aircraft equipment still are the two major bottlenecks in the aircraft production program, and further expansion of the productive capacity in both fields will be necessary to meet all mobilization requirements. Fowler said the USAF's fleet of all-weather fighters currently in production from the North American F-86D, the Lockheed F-94C and the Northrop F-89D—has been "held up by engi-

neering difficulties with the control system and newly developed jet engines."

There are highlights of the Fowler report pertaining to the aircraft industry.

■ **Production Program.** "The aircraft production program that has been seriously behind schedule in the 1953 Supplement."

Both the Air Force and the manufacturer (Curtis Wright) first they were ready optimistic in their estimate of how long it would take to re-organize the North American (North American-Bell) jet type for American production. Design difficulties are not so simple as they seem.

"Jet engines, which are now being produced at a rate double that of a year ago, are still a relatively new product and technological progress is rapid. The power of today's jet engines is five times that of the first jet engine in military use, and its most powerful engines are being developed. New models such as the J75 (J-45) and J65 (J-45) also are coming into being and are expected to be in use in great quantities in quantity use."

The new models are the first of the new high speed aircraft.

■ **Control System.** Delta value of deliveries of guided missiles is steadily increasing. In the third quarter deliveries in 1953, but technical difficulties, design changes, lack of technical personnel and other production problems continue to retard quantity output.

■ **Guided Missiles.** "Guided missiles are still largely in the stage of research, development or limited assembly-line production. Significant increases in deliveries depend on advancing and maintaining reliability performance in articles that can be produced with production line techniques."

■ **Avionics.** "The advance in the use of electronic equipment throughout the armed forces constitutes a technological revolution that is still in its early stages. Of the major types of electronic equipment and communications devices now in production, 95 are of new design, developed and put into production since Korea."

"The electronics industry has consequently been forced to expand and modify its facilities extensively and

commence production delays have occurred."

■ **Aircraft Fuel.** "High altitude aviation gasoline used in piston-engine aircraft will probably continue in tight supply for the next 15 months. The gap between demand and supply of aviation gasoline can now be filled largely by blending of high-octane gasoline extracted from other sources. But it is clear that this and other substitutes, even though present in the limit, would not meet the wartime needs for aviation gasoline. More production capacity is needed."

"One of the factors that makes the problem difficult is that probably in less than a decade the combined fleet of fighters in jet engines among military aircraft will have wiped out a substantial portion of the requirements which are present in the intervening years. This is the reason why the need is urgent to meet these requirements on time and in full."

■ **Aluminum.** In addition to the heavy freight and extensive repair program, a second USAF-financed program calls for building 20 144-in. rolling mills for producing tapered aluminum sheet required for high-speed aircraft skin. Additional aluminum fabricating capacity will be needed by the Air Force and high-strength alloy sheet and bar, welded tubing, heavy castings and hard alloy extrusions.

■ **Alloying Metals.** Increasing supply of alloying metals such as nickel, cobalt, copper and molybdenum are likely to be affected by the supplies with which alloying requirements for their metals in high-speed aircraft are increasing.

Gurney Reappointed For Six-Year Term

President Truman has reappointed Republican Chas. Gurney as a director of Civil Aeronautics Board for six years to Dec. 31, 1958, subject to Senate confirmation.

CAGI member Charles Ryan, was designated Chairman in 1953, but he has announced he will submit his resignation of the chairmanship to President Eisenhower Jan. 20.

Washington observers say Gurney the edge for Eisenhower's designation as Chairman.

Other members of the Board are John Lee and Joseph Adams, both Democrats.

Stage Set for Defense Shakeup

Loewt says organization at top level is key weakness; supports proposed plan for stronger Defense Secretary.

By Katherine Johnson

Secretary of Defense Robert Loewt has stirred the full swing, in what promises to be a top controversial shakeup over the coming months, reorganization of the Defense Department.

In the department's annual report, Loewt focused on the weakness of the Joint Chiefs of Staff, the Manpower Board and the Research and Development Board—agencies established in the Office of Secretary of Defense to put on plans of the three services to accomplish a "unified" overall military program.

Loewt points to the fact that membership of the three agencies is made up of equal representatives of the three services who make their own claims, a situation that leads itself to final legislation.

► **Final Decision**—"The fault," Loewt observed, "would come from the uncertainty over the period of time during which the services, materiel, or money."

The Manpower Board situation has been temporarily solved by the 1955 Fiscal Year Appropriation Act which gave the Secretary of Defense power of final decision on all personnel and production matters. Loewt has delegated to the civilian chairman on the service side authority over the three service representatives. The act expires July 1.

Loewt's newly support the current proposal to reorganize R&D, the R&D Board and Manpower Board from direct service participation. Under this proposal, members of the three agencies would be senior officers separated from

one service command and responsible only to the Secretary of Defense. It would mean stronger control of the Defense Department by the Secretary.

► **Objectives**—The general objective is the plan. The services might be authorized in executing decisions imposed externally from the top. The Chiefs of Staff, for example, would be responsible for carrying out programs while they had no direct hand in deciding.

Here are highlights of the reports by the services on the state of military production:

► **Air Force report**, by Secretary Thomas F. Pickles:

"The strategic air arm must be kept strong, for it constitutes the major deterrent to aggression. . . . It is global in scope. . . . It relies to a great extent on invasion being throughout the world to bring all possible targets within the range of its attack."

A report of the tactical command, wings are equipped with 315 propelled aircraft, although more still by World War II plane-engined F-84s and B-26s. As the modernization program proceeds, these aircraft will be replaced by newer aircraft jet types.

"The development and testing of guided missiles made great strides during the year. . . . The various types of guided missiles were integrated into the armed weapons systems. When operational they will be used in an offensive, strategic and tactical air mission."

► **Navy report**, by Secretary Dan Kinnell:

"The Navy recognizes that we are today witnessing much the dawn of the atomic age. . . . As future weapons

are developed the Navy will adapt them to shipboard use—be it the aerial weapons of the past and present, including the gun, the torpedo, and the atom bomb. A weapon on board ship is a weapon with worldwide utility."

"Based on an current world conditions, a consensus of 12 Fleet officers was acquired if the Navy is to carry out its primary mission. Experience has proven that in order to provide these ships to the fleet in an orderly fashion and to come of the particularly long lead-time required, increased construction should commence immediately."

"Experience to date has shown that neither the jet nor the propeller-driven aircraft has a monopoly of advantages, and each has certain disadvantages. As far as can be determined, both types will continue to be needed for an indefinite time in the future, each for its own particular and pronounced advantages."

► **Army report**, by Secretary Frank Pace:

"The Army is devoting top priority to all aspects of atomic warfare. . . . patting ahead vigorously with the development of its own methods of delivery of atomic firepower. . . . In the surface-to-surface field, the Army is developing a family of missiles which are designed to carry high explosive or atomic warheads well beyond the range of existing artillery weapons, even under the most adverse weather conditions."

"In the surface-to-air field, the Army's primary guided missile will provide, in an early date, a weapon capable of rapidly and accurately engaging and destroying the most modern, high-performance bombers at altitudes and ranges heretofore unknown."

"A chain radar system, which automatically tracks guided missiles through out their complete flight. . . . has been put into operation."

Significant progress has been made in the development of gas generating equipment for field production of guided missile propellants."

Australia Shelves Twin-Jet Delta

(McGraw-Hill World News)

Melbourne-Lock of Swiners has forced Commonwealth Aircraft Corp., Melbourne, to shelve plans for a high-performance twin-jet delta-wing plane which had advanced to the wind-tunnel test stage.

Observers last evening the hope that the design will be picked up by North American Aviation, Los Angeles, Calif., with whom CAC has marked contracts for a number of years.

Although no details of the craft are available, it was designed for Rolls-Royce Avon auxiliary turbojets.

Cessna Jet

► New AF trainer marks entry in turbojet field.

► Twin-engine transport and Model 180 unveiled.

By Alexander McNulty

One of the fastest moving small aircraft companies in the business—Cessna Aircraft Co. at Wichita—last week unveiled three new airplane models.

Two of these are new advances for Cessna:

► **A 400-hp, twin-jet military trainer**
 ► **A highly streamlined, low-wing, tri-cyclic, five-place business plane** designed to compete with the Beech Twin-Bonanza and Aero Commander

The third is a new high-powered, higher performance redesign of Cessna's 175 high wing four-place—now at \$10,000-\$12,500 executive plane market.

► **Sales Up**—Meanwhile Cessna President Donnie Wallace announced in his annual report to stockholders that Cessna sales for 1952 increased 55% over 1951, totaling \$48 million (including \$38 million military aircraft sales). It was the largest volume of sales since 1943. Earnings after taxes added up to \$2,557,000 on \$8.99 a share. Income taxes paid amounted to \$5.95 per share and dividends were 50 cents a share. Military backlog of Cessna now stands at 575 orders.

Most promising of the new models from the company's Wichita plant is the twin-jet Model 310 military trainer, with which Cessna was the USAF's best selected Trans-X competitor.

Most immediately profitable is the new Cessna Model 180 executive plane guaranteed to cruise at 140 mph. The four-place aircraft with at \$12,500 De Havilland stock with a main flyaway Feb 28 at Wichita.

A year off in the sales picture but a promising contender in the growing twin-engine executive-plane market is Cessna's Model 310, scheduled for its first flight last week.

► **Jet Trainer**—Within days 14 other designs submitted by seven manufacturers, the Cessna jet trainer will be selected by two military departments for 152 engines of 500 hp, direct each.

They are French Turbomecans design and built in the U.S. by Continental Motor Corp. Aviation Week (Industry Observer, Aug. 4) predicted that the Mustang was the most likely prospect for the XT program.

Cessna has a Phase I contract for preliminary engineering and construc-



MODEL 310 two-place turbojet trainer now USAF competition over 14 other designs



MODEL 180 four-place executive plane is entering flight test phase of development.



MODEL 440 four-engine is in production at Wichita and deliveries begin Feb. 26.



NEW SWEDISH JET TESTED

First flight use of the new Swedish J 29. Loewt aircraft ground attack plane (Aviation Week Nov. 24, p. 18), shown taking off with its large Fowler-type flap extended. The 700-hp craft is

powered by a Rolls-Royce Avon auxiliary engine and has range wing and tail. First jet attack on sea. Wings and tail of the new craft have successfully tested action.

► **Trainer**—Deth-Dunstrom of the aircraft are span, 31 ft., length, 27 ft. 1 in., height, 9 ft. 10 in. Cessna gross weight is approximately 5,500 lbs. A top speed of over 400 mph (405 mph) is promised.

The 310 is the first small jet airplane built in America, going to a lead

tion of a midget, with a second contract in the Pentagon works for jet train on test and proving production.

The 115 design is to be a low-wing, two-place, side-by-side, all-metal craft with jet engines fixed into the wing roots and with fully retractable main landing gear.

► **Trainer**—Deth-Dunstrom of the aircraft are span, 31 ft., length, 27 ft. 1 in., height, 9 ft. 10 in. Cessna gross weight is approximately 5,500 lbs. A top speed of over 400 mph (405 mph) is promised.

The 310 is the first small jet airplane built in America, going to a lead

CAB Denies UAL's Low-Fare Service

Civil Aeronautics Board last week gave United Air Lines until next week to decide the future of UAL's coach. CAB denied United's recent petition for permission to charge coach fares for what the Board considers first-class service. The Board order was the latest development in a controversy touched off last month when UAL, president W. A. Patterson, announced that high-density seating is cheap and began selling only 54 seats on his 66-passenger DC-4 coaches.

Patterson answered almost immedi-

ately that "... United Air Lines plans to continue to operate its coach service with the lowest seating capacity."

► **Fixed Data High-Density.** Patterson told a business association in Florida "We were forced into the coach business by threat. ... We were reluctant and hesitant about going into the coach business. Why? Because we weren't satisfied we were doing the right thing."

Because CAB had approved low aircraft fares on the basis of a maximum 64 passengers DC-4 capacity, United was forced to petition the Board for a special exemption to offer only 54 seats on its DC-4s until the airline could modify the aircraft to seat 58 passengers—a capacity United considers safe. That is

the position which was denied by the Board.

"The lowered seating density involved in United's proposal," the Board ruled, "would undoubtedly raise the unit cost of ... coach service, making such service less economic, thus cutting off passengers from ... low cost transportation."

► **Public Hearings Possible.** If Patterson continues his disputes with CAB on the coach safety issue, the Board will be required to hold public hearings on United's coach issue. Meanwhile, CAB has received an application from random Air America for a temporary exemption to provide coach service on United's routes.



CRESCENT WING (Hawley Page H.P. 80) with sweeping Vickers Valiant and Avro Vulcan delta, comprises future RAF jet bombers.

British Set Sights on Subsonic Jet Bomber Force

By Nur McKinnick
(McGraw-Hill World News)

London—The Royal Air Force is aiming for operational flight by 1955 of three jet-powered long-range heavy bombers—the Vickers Valiant, the Avro Vulcan and the recently tested Hawley Page H.P. 80.

The H.P. 80 made its first flight during the first days of last year, putting into the air a true successor bomber wing that Hawley Page says "combines the merits of the delta, swept and conventional wings without any of their disadvantages."

All three bombers will fly at operational speeds estimated at 600 mph and altitudes about 30,000 ft.

British designers say the opening speed of the heavy bombers will be "on the level of the new fighters," having carry weights to cross and to cross the threshold based on intercontinental range.

► **Larger Engines Later.** The bombers eventually will be powered by jets of about 10,000 lb thrust each, although engines of less power are installed in the prototypes. Avro's delta wing Vul can still be driven in operational flight by four Bristol Olympus jets, rated at nearly 10,000 lb thrust. Modified constant wing Valiant, now powered by

four Rolls-Royce Avons, is expected to have engines of the same type but more powerful than the present Avon rating of 7,500 lb. Four Armstrong-Whitely Supershots installed in the H.P. 80, expected to be known as the Victor, also will be pushed well past the current thrust of 4,500 lb.

The British press says the Valiant's bomb load will be twice that of a World War II heavy bomber. The H.P. 80 should be in the same class, but the Valiant probably will not.

Wing span of the Valiant is estimated at 90 ft., and the Valiant and the H.P. 80 at approximately 120 ft. The three bombers largely will be hand-built and hand-modified, leaving the initial order to manufacturers between 25 and 50 of each type.

► **H.P. Chassis-Staking wing plan** of the three "VVs" are testimony to Britain's intense experimentation with configurations of intercontinental flight. Each manufacturer makes broad claims for his own design, but Hawley Page claims for the current top three all.

R. S. Stafford, chief designer at Hawley Page, says the H.P. 80's constant wing (Armstrong-Whitely Nov. 17, 1952, p. 22) will allow the Victor to "fly faster, farther and higher with greater economy."

The constant wings back at three

angles set off in three sections of the wing. Thickets taper outward from a heavy root section toward the Valiant's engine housings to an extremely thin tip.

"We could build a very thin straight wing," Stafford says, "but our bomber would look like a Christmas tree with engines and fuel tanks hanging from the wing and the undercarriage taking up useful space in the fuselage. Such a design would be extremely heavy and out of the running as a long-range bomber. Figures show that practicable wing thickness at a high Mach number can be employed if combined with sweep."

► **Other Characteristics.** Stafford says the extreme slope of the wing allows an unobstructed bomb-bay and ejection seats of engines, fuel and undercarriage in a light, efficient structure with no weight penalty.

Other characteristics of the new Hawley Page bomber:

- **Leading-edge flaps** as well as flaps on the trailing edge of the wing.
- **High degree of noise penetration** at indicated by the small size of windows in the H.P. 80.
- **Control balancing system** is operated by observers because of a trail opening in the leading edge of the Victor's sweptback tail fin.

EEMCO

technical bulletin

LIGHTWEIGHT COMPACT STARTER-GENERATOR FOR BOEING TURBINE



The starter-generator used on the Boeing 582 Turbine is another example of EEMCO ability to design and produce means to solve special problems.

The EEMCO unit helps the turbine up to 6000 RPM in 1/2 sec and is able to support the starting effort after taking up to 10,000 in-lb RPM. When the turbine is operating, it acts as a generator without mechanical changeover at zero loss and is capable of delivering 30 amp continuously.

Compactness and light weight result from the direct coupling of the starter-generator with engine gear train, making it an integral part of the turbine.

High temperatures are involved since the components are in close proximity with the combustion chamber.

This EEMCO starter-generator is ideal for use on all types of small turbines wherever a combination of starting and generating is required.

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mental conditions applied to the test chambers and on operation of the fuel system as it is subjected to a wide range of flight conditions.

A flying test bed device permits shifting of the entire fuel system assembly to correspond to the position of an engine in flight.

Various individual fuel system components can be checked in separate testing containers. Thus, one of these can become a vibrator and chamber for solving and predicting conditions.

► Vaportech Scheme—Jet fuel is stored underground. Hot water heats the fuel before it enters the fuel system, while deaerated and CCL are introduced to give sub zero temperatures. Hot and cold boxes—50 ft. long and 14 ft. square—are used for external control of temperature.

Northrop reports that provisions have been made to run fuel lines directly to production models of aircraft to effect in-flight testing of fuel systems on the ground.

Ben Berman, Northrop test facilities engineer, supervised design and installation of the equipment and heads the laboratory.

Navy Super Connie Passes Strength Test

The Navy's new RTV-1 Super Connie recently passed final strength tests which concentrated some models of trials.

A special counterweighted steel framework was erected about the entire plane, together with a 150-pick system embodying weights from 1,500 lb. capacity to a size capable of 100 mg. a five-ton frame boom.

Load rigging to the loadings plus side bracing, external forces permitted a total disembedding force of 175,000 lb. Finality tests also included personnel from trials to simulate high altitude conditions.

Meanwhile, another RTV-1 has been undergoing extensive checks on flight characteristics at Lockheed's advanced flight test division.

The RTV-1, powered with Wright Turbo Propagator engines, is pegged to cruise over long ranges at 916 mph. With top speed approaching 960 mph. Its objectives to deliver orders, 12 aircraft have entered the phase, which first flew last November.



HEATED BOGIE

New large landing gear fitted with rubber belts is used to enable aircraft to utilize rough landing fields safely. The invention, Coast General Research, developer of an earlier four-wheel large landing gear, claims the belt arrangement doubles the gear's support

LANDING GEAR

surface, thereby reducing cost load. Experimental model shown here is installed on an Auster VII. S. Design was developed for the Embellishment of Scientific Technology, July, when Eastman a hand of the new machine began to build.

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Ramjets or Rockets for Missiles?

- Marquardt favors his 'flying stovepipes.'
- Says they offer longer range than rockets.

By Scott H. Rosenberg

A possible outcome of the nation's status with regard to development of long-range missiles at the site of activities at Marquardt Aircraft Co., Van Nuys, Calif.

Marquardt, a pioneer since 1944 in rocket engines, has stated its future on this type of powerplant and is devoted exclusively to its development and production. Roy M. Marquardt, company president, says that the subject is the engine that will power any supersonic missile with outstanding range in the foreseeable future.

Many engineers say the rocket is as likely a powerplant as the ramjet for this purpose. It possesses a much higher order of speed, and difficulties in the way of producing a practical long-range rocket are no greater than those confronting the supersonic ramjet, they claim.

Marquardt, however, sees the rocket's use confined to shorter flights. Many engineers agree to share his views. Rockets may take us to the moon, according to Marquardt, but their usage soon is just a few hundred miles.

Disagreeing with—speaking to Marquardt, one gets the feeling that money in the industry thinks that country can do better than it has in the race with Russia to develop intercontinental missiles. While a big chunk in production of some missile types is in the offing, sharp reverses in development and production activities exist around the intercontinental missile's power plant is imminent, Marquardt told Aviation Week. The supersonic ramjet engine can be considered a long-term development, he stated.

A look at the company's annual re-



MARQUARDT lab at Van Nuys, Calif., where jet engine parts are tested.

port for 1951 gives a clue to U. S. interest in ramjets. The company was acquired in 1946, when Marquardt became president, in addition to his duties as director of aeronautical research at the University of Southern California, then engaged in ramjet research for the Navy.

Kids have been gradually in the past eight years, peaking at some 100,000

tons in the last two. They were \$1.8 million in 1951, a 55% increase over the year before. Sales last year were expected to reach about \$6 million. More than half of this income has been for research and development.

Production is on the upgrade. Employment jumped from 550 to 825 in the last year. But some of the production is for supersonic ramjets, in



LOCKHEED X-2 missile shown by Marquardt's president.



LOCKHEED Shooting Star made first ramjet-powered flight.



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THE MAN WE MEAN IS A COMPOSITE of the editorial staff of this magazine. Far, obviously, no one individual could ever accomplish such a vast business news job. It's the result of many qualified men of diversified and specialized talents.

AND, THERE'S ANOTHER SIDE TO THIS "COMPOSITE MAN," another complete new service which complements the editorial section of this magazine—the advertising pages. It's been said that in a business publication the editorial pages tell "how they do it"—"they" being all the industry's front line of innovators and improvers—and the advertising pages tell "with what." Each issue unfolds an industrial exposition before you—giving a ready panorama of up-to-date tools, materials, equipment.

SUCH A "MAN" IS ON YOUR PAYROLL. Be sure to "listen" regularly and carefully to the practical business information he gathers.



McGraw-Hill PUBLICATIONS



MARK I SKELETON, above, has "bones" stretched to rigid contouring sections. In Mark II, below, rubber flesh is stretched directly to skeleton.

Dummy Takes Beating For Science's Sake

If you're testing tools, harnesses, soil or equipment, scientifically equip your other sciences which require expendable subjects, here's the right man for the job.

Mark II is an anthropomorphic dummy, and you can tell him that much to his face.

His only purpose in life is to be beaten and persecuted and torn into bits for the advancement of science.

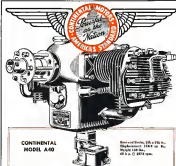
It's a stand-in for the human body, a test specimen of a man, a synthetic subject for all sorts of tests designed to harness.

It's available on a 15-week delivery basis, from the Alderson Research Laboratories, 10 E. 34 St., New York 16. ■ Navy Alderson-Alderson developed the dummy to meet requirements of the Navy for a synthetic human being. The dummy had to be portable, with detailed structure and consistent size. Usual characteristics of weight and weight distribution had to be met.

His proportions are those of the average of Naval aviation cadets trained during the second World War. Overall height is 5 ft. 9 in., and weight is 154 lb.

Flesh of the dummy—composed of sections of foam and sheet rubber—is stretched directly to the skeleton. Therefore, elastic cords, which simulate the stiffness of muscles, are unnecessary to move bones.

Most of the major joints of the body are reinforced, except for knee articulations to handle, feet and the



CONTINENTAL
MODEL A40

Basic cost \$2,000; 150 h.p. in 1934. Weight 1,000 lbs. 200 h.p. (1934) 1,200 lbs.

• THE FAMOUS CONTINENTAL A40 • IT HELPED TO PUT THE WORLD ON WINGS

Nineteen thirty-three, golden anniversary of Kitty Hawk, is a fitting time to take note of features which have furthered man's conquest of the air. ... High in any list of such features, of course, is Continental Motors' introduction of the famous A40 power plant, pioneer precision-built aircraft engine of moderate price. It is doubtful if any other single development since the Wright Brothers' first powered flight has done so much to put the world on wings. ... It is a tribute to Continental engineering and workmanship, that so many of these old-timers are still in service, and also that their line successors, listed below, are first choice for the general use aircraft of today.

MODEL	HP	Typ.	Weight	HP.
A40-A	4	H	171.0	45 @ 2300
CR-12	4	H	176.0	45 @ 2375
CR-8F	4	H	208.0	70 @ 2475
CR-12-B	4	H	201.2	145 @ 2700
E115	6	H	471.0	145 @ 2300
ES-54	6	H	471.0	220 @ 2800
O-212-A	4	H	315.0	130 @ 2500
O-475-A	6	H	471.0	220 @ 2400
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Rocket Society Summaries Concluded

Rocket principles and principles have among the subjects discussed in papers presented at the American Rocket Society's recent seventh annual convention held in New York.

The following five summaries conclude American Rocket's coverage of the meeting. Previous summaries were printed Dec. 21, 1962, p. 31, and Jan. 5, p. 41.

• The Evolution of Computing Rocket Propellant Components for Two-Dimensional Problems, A. L. Feldman, Thermodynamics Department, General Motors Research Laboratories.

Members met and in proposed at the same time establishing the status, distribution of computing rocket propellant components. It applies to models of the same class performing identical functions, but in a way, covering the same data with the same period. The advantages are derived from simple stable performance parameters.

Characteristics of a hypothetical two-stage long-range rocket vehicle are presented. Exchange rate covers its parts for this vehicle to show the order of alternate components that can be made between weight and efficiency.

Several propellant arrangements are presented for this model and the proposed

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Details of H.D. 45 Jet Transport

There have been some changes made in the general layout of the new Hand-Dubois H.D. 45 Jetair jet transport. The extremely high aspect ratio—up to 30 in earlier models—which had distinguished the H.D. line, has been reduced in this model to a more conventional 16.5.

The H.D. 45 80-seat jet transport—Hand's latest design—has been ordered by the French government's aeronautics transport commission.

Here is what Hand proposes. The general geometry of the plane consists of the wings, with extremely broad high-aspect ratio wing. Engines are mounted on stub wings at the foreleg bottom,

three engines and the basic strut tributes life to the arrangement.

Loading gate is retractable, and the double tail has given way to the single fin and rudder.

Fuselage have not been mentioned yet, but they will be made up in the 5,000 lb. class, same as the Rolls-Royce P.S. 16, scheduled for the de Havilland Comet 3.

Span of the H.D. 45 is 347.6 ft., length 98.4 ft. and wing area 1,154 sq. ft. The plane weighs 90,000 lb., of which 28,000 lb. is fuel carried in wing mounted tanks like those of the Comet 3. Expected cruising speed is 452 mph with a 27,540 lb. payload.

Photoelastic Coat Shows Stresses

A continuous strain gage, formed from a layer of photoelastic material cut in the surface of an airplane component, is being studied at the College of Aeronautics, Cranfield, England.

The technique, one modification of the photoelastic method of stress analysis, was recently reported to the Royal Aeronautical Society by H. T. Jeney, Reader in Photoelasticity at University College, London.

Jeney's paper, "The Scope and Limitations of the Photoelastic Method of Stress Analysis," covers new developments in the field, developments which have taken place largely as research laboratories without the resources to make extensive investigations. These new schemes have been tried in enough cases, says the author, to demonstrate their value in a wide variety of stress problems.

► **Fundamental**—Photoelastic studies are made with models of the subject formed from a plastic material. These are most desirable in the two-dimensional form used for display and museum exhibitions.

Polarized light is used to view the models under load, and the resulting pattern of colors in the model serves as a map of loading and ensuing stresses.

Where there is two-dimensional stress distribution, such as in a structural or

loaded joint section, it follows that two-dimensional models are made. But it is important to use the same kind of models for cases where the stress distribution of the subject under study varies in the three-dimensional.

In an 18-hour section, for example, with the loading in the end plane of the part, parallel to the plane of the web, the web stresses will be purely two-dimensional and are deduced from the fringe patterns. Most stresses through the thickness of the flange can be deduced from the patterns in the flange.

Friels between flange and web would require the three-dimensional treatment, however.

Victor Amann, Ltd., reports a recent series of tests made on such a part showed high stresses which cut outside had failed to bring out. The photoelastic tests took three weeks and gave better information than that obtained from calculations which had taken each longer.

► **In Three Dimensions**—When solids are studied by photoelastic means, the models generally have the stresses "frozen" into them by some method. Then they are cut out from the model and a series of two-dimensional studies made. Putting them all together gives the distribution for the solid.

This technique is used in the study



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of films in both locations and beams.

The use of a plastic material for the model being studied has been emphasized on the grounds of economy. But the author points out that the plastic material is better for these materials, precisely right up to the point of fracture. Furthermore, they are easy to handle and easy to paint.

The only way in which the materials behave like plastics is in the presence of creep under load. This is handled by waiting until the rate of creep has become negligibly small, and then taking measurements.

So the stress distribution of the models is that which would occur in the prototype if the prototype material retained a linear stress-strain curve throughout the stress range. ►How Good?—Accuracy varies quite nicely with the problem, says Jesop, and it is impossible to lay down any general laws.

Optical measurements have very high accuracy, of course, and so the major error comes in the material, the construction of the model and the reproduction of the loading conditions.

The author says that of all these, the error due to reproduction of loading conditions is generally the most serious. These are relatively large strains produced in the model and these may tend to produce strain differences in exposed leads.

As an estimate of accuracy, the author says that in a straight beam-instrumented model, you might get the answer within one to five percent. This could rise to a possible 10 or 12% where there are unbalanced forces acting on hole boundaries, and to five to 30% when a three-dimensional model is used.

►For the Future—Jesop says that the continuous stress gage idea being studied at the College of Aeronautics is a promising method. The plastic is cut over the entire surface of the model, and the optical effect as the load is observed by a reflection method.

This has been tried with a number of models, but accuracy and reliability have not yet been completely established.

The range of application will be limited by the difficulty of observation, says Jesop. But there is the possibility of reinforcing the nearest and coldest of plastic film at the surface of a structure.

Survey Made of Arctic Starting Data

Recent emphasis on Arctic operations of Air Force material has focused interest on the problem of starting an engine on a cold day.

Many studies have been made and

reported in technical meetings. Now Canada's National Research Council has completed a study of the situation in a single place for study reference.

The Council's report MP-9—"Laboratory Survey of the Effect of Sub-Zero Temperature on Fuel and Lubricants"—covers the field, with particular emphasis on the part played by petroleum products. Although the general area of interest is covered, a specific series of tests with representative and realistic engine regimes, and diagrams of engine and lubricant have universal application.

Latest date of any abstract in the survey is about October 1951.

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at the picture of Boeing's Tex Johnson wearing one of the new suits (Aviation Week, Oct. 25, p. 17). They fit better than the epaulettes, and to wear one all day long must be about like wearing a too-small suit of long rubber underwear.

A few weeks back, Arthur Godfrey's TV show featured a demonstration of the Navy's survival clothing for ditching or parachuting. Godfrey did a lot of serious step-testing in which he appeared in the nearest layer and then sailed on the rim of equipment.

What with survival suit, Mae West, P.A.-s, parachute and two helmets with two masks, explosives, radio and goggles, he was pretty well clothed at the end of the performance. It took four Navy pilots I met to help him out of this. Surely it's about time for some bright outfit to come up with a one-piece suit which has all this in one collection of fabric, straps and appendages. This suit could be in the airplane, set in place by the plane captain. The pilot gets in, sits on the seat, pulls straps over his shoulders, hips and ankles, and he's ready for emergency.

The next anniversary of the first German V-2 being hit just passed. That great example, prototype of rocket-fueled generation of such weapons, set standards which all V-2 stand today.

At the recent annual convention of the American Rocket Society, one of the more outspoken missile engineers had this to say about the V-2: "If we had wanted a missile five years ago, we would have been forced to produce the V-2. If we want a missile today, we'd have to produce the V-2. And the thing I'm afraid of is that one want a missile in five years, we're going to have to resurrect the V-2."

One of the speakers at the American Rocket Society meetings implied that some progress had been made in a design line with guided missiles and space travel thus was made with the atomic bomb.

For the second, Nuclear Atomic—the principle of the atomic bomb—was discovered in 1939. The first atomic bomb was used in 1945.

We have had seven and a half years since the end of the war to pursue the guided missile. We have had over 30 years of liquid-propellant rocket motor development and the same amount of time on the airplane. We have not to say a word, develop the most, accurate, most economical, guided missile in combat.

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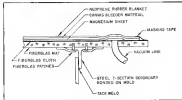
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Sheet Magnesium Problem Licked

Low-temperature forming is made possible by use of Fibreglas mold and Neoprene blanket at low pressure.

The use of neoprene sheet in air frame construction has paid big dividends (AVIATION WEEK 28, p. 11). But the designer cannot always utilize the metal to best advantage, because of manufacturing problems involved.

One of these world-famous difficulties was licked recently at Chance Vought Aircraft division of United Aircraft Corp. The division's production engineers have found that vacuum pressure and low oven temperatures can be used to form Fibreglas (bonded) magnesium alloy sheet, and it has also been established that forming and bonding magnesium at the same time is possible.

Data on the procedure were furnished to AVIATION WEEK by Stanley Pelton of CV's production design engineering staff.

► **Temperature Factor**—As an example of the manufacturing problem involved, Pelton relates that Dow Chemical Co., in its atomic physical properties, states metals that at 251-104°F are formed at a minimum temperature of 300°F, and he adds that temperatures not over 250°F are used. These limitations, Pelton claims, make traditional forming difficult and drop-hammer operations nearly impossible.

CV engineers found that when dry magnesium neoprene it was necessary

to increase the working temperatures at the expense of the physical properties. Also, with existing equipment it was difficult to control temperature and time. In extreme cases the drop-hammer parts, it was necessary to redesign the parts for the insulating-condition neoprene or aluminum alloy—resulting in an increase in weight.

► **Fibreglas Mold**—By forming the parts that give trouble were large external panels. Redesign here could have been twice as easy as just an increase in metal gage. Now new approach to the neoprene-forming problem, if approved, would require heat and pressure, both accurately controlled.

Low-pressure forming procedure indicated interesting possibilities, and CV's engineers in the work made a neoprene relatively easy. Insulated Fibreglas mat and Neoprene blankets proved suitable for forming magnesium sheet. The sheet is heated as the mold and lined with a narrow blanket material. Then it covered with a Neoprene blanket tape sealed to the mat. The air is pumped from between the mold and the blanket before the sheet is put in an oven to solidify. Using this procedure, neoprene gages from 0.01 to 0.03 have been formed and physical properties of the material have not been adversely affected. Pelton reports.

► **Conditions**—In the oven the strip is held under vacuum at 180°F for 120 minutes. In the solidifying oven is 50-60 psi, temperature is 250-270°F and time is 20-75 minutes.

Time at temperature is determined by the tool weight involved. If a part must be in contact without sandblasting, two hours is an even sufficient. Pelton says. If the part is to be used as a bonded assembly, the skin is treated not enough to give it the desired strength, but is removed during the bonding cycle.

Since assemblies are formed and bonded in one annealing operation. The elimination of post-annealing operations, with attendant savings in the labor and materials costs, and also increases an excellent fit between skin and doubler.

Compared with a drop-hammer tool for the same job, a Fibreglas mold of feeds considerable savings. For both labor and material, drop-hammer costs are about triple those for the Fibreglas molds, Pelton claims.

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company will construct and equip a new plant, under authorization from the National Production Authority. No government funds are involved in the new construction.

Located at Milwaukie, the plant will have a total area of 143,000 sq. ft., of which 173,000 sq. ft. will be devoted to the production of projected large speed machine tools with electronic controls, photoelectric devices, three dimensional tracer mechanisms, etc. Plant is scheduled for completion in mid 1953 and machine tool delivery will be coordinated with the progress of the building. To facilitate production expansion, about 50 of these large tools are expected to be installed.

Initially the project will be staffed with about 10 design engineers. Skilled mechanics and assemblers will total about 120.

Annual output at first will be approximately \$5 million. If sufficient sales potential is developed, production of the new plant could be doubled, it is reported, with space available for future expansion.

Defense Department will have first call on production from the new plant, but a great share of the production in the immediate future will be available for non-defense output. The company says it is free to take business from any source whatsoever.

Avro Shaper Speeds Jet Blade Output

A new shaper machine developed at A. V. Roe Canada Ltd., Milwaukie, Ontario, is setting 1953's production record in turning out turbine and compressor blades, the company says.

Developed by Avro engineers, J. D. Clark and E. W. Henson, the tool strikes to a carbon—see on each side of the workpiece—parallel, eliminating bending stresses. Supports for the blade and the pattern are pivoted to accommodate varying rate in widening of pattern throat and center, so that chatter doesn't occur.

Patterning holds the throat in close contact with the pattern, and causes an automatically linked to the pattern. During the backward stroke of the frame, the carbon are individually damaged from the workpiece. Automatic tapered widening is provided between the cut line strokes.

Titanium Studied for F-89D Scorpion Pods

Titanium is being investigated for application in F-89D Scorpion's radiating wingtip pods. Northrop Aircraft reports. The company was selected under a USAF special engineering de-

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	AV-200-2	115V AC 1-Phase	115	1.0	115	0.15	1.5	1.5	2.0	2.0
Receivers	AV-200-3	115V AC 1-Phase	115	1.0	115	0.15	1.5	1.5	2.0	2.0
	AV-200-4	115V AC 1-Phase	115	1.0	115	0.15	1.5	1.5	2.0	2.0
Control Units	AV-200-5	115V AC 1-Phase	115	1.0	115	0.15	1.5	1.5	2.0	2.0
	AV-200-6	115V AC 1-Phase	115	1.0	115	0.15	1.5	1.5	2.0	2.0
Receivers	AV-200-7	115V AC 1-Phase	115	1.0	115	0.15	1.5	1.5	2.0	2.0
	AV-200-8	115V AC 1-Phase	115	1.0	115	0.15	1.5	1.5	2.0	2.0
Control Units	AV-200-9	115V AC 1-Phase	115	1.0	115	0.15	1.5	1.5	2.0	2.0
	AV-200-10	115V AC 1-Phase	115	1.0	115	0.15	1.5	1.5	2.0	2.0

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The HAYDON 1000 Elapsed Time Indicator indicates operating time of components with specific life or warning requirements. This and other timing indicators of all sizes, from one-minute and 400 cycle operation for test applications to electronic devices, where tubes or other components should be replaced at specified intervals. Timing time indicators are present wherever any servicing, repair, trouble maintenance that prevents repairs follow a sequence.

HAYDON specializes in the manufacture of timing components for standard applications and in the design and production of custom-engineered timing for various applications. The basic element of all HAYDON timing is an accurately rugged method of time measurement which ensures long, most accurate. These are, good design and ability to operate in any position of design, rugged, unaltered.

HAYDON also manufactures a variety of timers especially designed for 40 cycle 400 cycle or D.C. type drive in military applications. The 4000 Series "Bugeye" type, hermetically sealed Time Delay device are available in a wide range of delays from seconds to hours.

COMPLETE INFORMATION

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HAYDON Manufacturing Co., Inc.

Subsidiary of GENERAL TIME CORPORATION

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sign contract because its upkeep is solves the greatest variety of forming, machining, welding and other fabrication techniques of any composite and of comparable size, Northrup says.

The contract calls for redesign of the tool to determine fabrication methods and engineering data necessary for the use of titanium. Laboratory research already underway for the project is fabricating metallurgical, physical and structural data on compositionally pure titanium and some of its weldable alloys.



Universal Machine Tests Large Parts

A new universal has been developed for testing large aircraft structures such as bridging members and wings. It will permit a working capacity on a finished machine just less than 10, according to the manufacturer.

The 300,000-lb. floortype machine is made of welded steel. Its construction is driven by a Thyristor motor mounted on the controlled steel column at the bottom of the test. The construction is raised or lowered on fixed tracks.

Speed range of the motor is 231, with an overall loading speed of 121 to 0.5 in./min. and a fully lowered speed of 15 in./min. Excavator loads are made possible by special flexure plate construction in each phase.

The machine is available to industry in the general price range of standard table-type universal testing machines. Young Testing Machine Co., Shelton 10-16, New Milford, Pa.

R-R Plant for Australia

(McGraw-Hill News)

Sydney, Australia—Rally Royce of England has announced it will build an aircraft factory here for repair and service of its Dart and Arrow jet engines. The factory is expected to be fully productive in 18 months.

Better Products Thru Better Design

how product-design engineers,
working with MICRO engineers, prove that "the use
of MICRO Switches is a principle of better design."



The hardest working man today is in the great research laboratories of America.

There, spurred by dissatisfaction with present materials, methods and methods, they are working constantly with chemical, electrical, electronic and mechanical forces to improve existing processes and products.

Their findings are then passed on to thousands of skilled design engineers who convert them into practical reality.

Each on the list of scientific compressions available to these design engineers in this conversion, is the small, lightweight, highly precise MICRO switch, made in more than 6,000 different configurations.

Time after time, not only in the design of new products, but in the redesign of existing products, design engineers have proved that "the use of MICRO switches is a principle of better design." Here are a few examples:

To meet ever-increasing demands for speedier and more efficient machine in plastic-molding departments throughout industry, one molding-machine manufacturer—with MICRO engineers co-operating—completely redesigned his product, making it fully automatic through use of 14 MICRO switches. Time switches make possible twelve timing, starting and relay operations within 33 seconds—a speed never previously

approached. Many progressive manufacturing have built their own molding departments around this technological machine. Result: faster and more accurate production at lower cost because of better design.

In aircraft design, MICRO precision switches have proved speedily successful. Today, few airplanes are manufactured in the American continent that do not incorporate MICRO units in their design—from a fly in small planes to over 100 in large commercial carriers and military bombers. Certain MICRO models (including the "salesman's," with its almost unobtainable small size and weight and its outstanding performance characteristics) have brought further reductions in size and weight factors. MICRO engineers cooperate closely with the aircraft industry in developing the requirements of this fast-moving field.

Among the fundamental problems of the timer industry has been the maintenance of accurate, consistent operation of a pre-selected wire interval in the timing control. Frequently, this was accomplished by cambranes, expensive mechanisms. Today, thanks to MICRO precision switches, the process has been made simpler, more positive, less costly and less susceptible to mechanical failure. Small, high-capacity MICRO switches, with their almost everlasting repeatability of a precise opening point, have facilitated compact and streamlined designs—and no efficiency—as timing controls, their period of what can be done with design engineers and MICRO field engineers work together.

So it goes throughout industry—"Better Products Thru Better Design"—fresh evidence, convincing proof that "the use of MICRO switches is a principle of better design."

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New Fastener Seals Gas Casings

A patent for a quick-setting, self-locking fastener, designed mainly to secure water- and gas-tight casings, has been awarded to William Davis, of Davis Fastener Co. It is already in use in aviation and other aerospace applications.

The fastener can be gripped by its enlarged head, so no screwdriver is necessary. It takes less counterbore space than required for the receptacle and spring usually associated with fasteners of this type, is a small size in a milled slot replacing that position.

When the fastener is clamped, springs in the head of the fastener bear down to keep the casing tightly sealed. Davis Fastener Co., Inc., Balauxon, N. Y.

Shock Padding For Plane Parts

A new shock-resistant blocking material has been developed by Calumet Corp. to give improved protection in packaging of delicate aircraft parts, both lightweight and heavy.

Calumet uses the polyvinyl chloride compound, known as GPC, also can be used to crush padding.

It can be used under Arctic weather conditions and formed or molded into virtually any shape, the manufacturer claims. The material is non-flammable, fungus-proof and can be bonded to any smooth surface.

Calumet Corp., 333 N. Santa Anita, Arcadia, Calif.

PRODUCTION BRIEFING

► D & R (Donald-Rosen) Industries, Inc., have moved to new quarters covering more than 25,000 sq. ft. at 2400 West Jefferson Ave., Detroit. The firm packages and processes aircraft parts for domestic shipment and export. Superior to the steel doors.

► Nage Aircraft division of Borg Warner Corp., Muskegon, Mich., has secured a contract from General Motors to build parts for the P-50F Republic Thunderbolt, Muskegon, Mich.

► Western Fiberglass Glass Products Co., Los Angeles, has been appointed West Coast distributor for Roushflex Corp., Belleville, N. J., manufacturer of air craft and industrial basic assemblies and plastic products.

► Vickers El Segundo division, 2160 East Imperial Highway, El Segundo, Calif., has expanded its facilities for designing and producing aircraft hydraulic



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Cabin No. 5 offers a full length view of the plane's beautiful interior with an mahogany paneling, modern lines and useful overhead luggage.

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Aviation Week Picture Brief



WOOD The six main elliptical glulam-laminated Douglas fir arches in this new
Continental Can Co. hangar at Newark, N. J. (Below) the world's
largest, open 350 ft., are 45 ft. high in the center. Wykes Abbott Corp., Plainfield,
N. J., designed and built it. Turner Structures, Portland, Ore., fabricated the arches.

Unusual New Hangar Designs

STEEL Easingly new 54-ft.-wide light hangar at Wichita can accommodate
12 B-47s, or one of the largest of its type. Continents construction, with
all support at center, permits unobstructed movement through the hangar. Building,
part of \$50-million expansion program at Wichita, took 9,250 tons of steel.



Advanced design of Convair's big P5Y-1 calls for SAFETY GLASS by PITTSBURGH



CONVAIL'S NEW P5Y-1 was over San Diego, Calif., on a recent test
flight. The photo (right) shows the cockpit window, which was designed
and built at the Safety Glass Division of Pittsburgh Plate Glass
Company.



COCKPIT of the cockpit, showing the cockpit window, which was designed
and built at the Safety Glass Division of Pittsburgh Plate Glass
Company.

With cruising speeds in excess of 350 miles
per hour and a rate of climb that is faster
than that of some World War II fighters, Con-
vail's new 60-ton P5Y-1 airplane represents a
whole new conception of the functions of water-
based aircraft.

Reflecting trends in the finest and most ad-
vanced aircraft designs, the P5Y-1 has electri-
cally-heated Pittsburgh NESA Glass in the entire
frontal area, including both the pilot's and co-
pilot's windshields. Pilot's sliding windows are
pressure-bearing, offset-type Pittsburgh Flexural.

Years of research and testing—including the
building of a powerful 1/10th scale model—went

into design of the P5Y-1, and glass and glazing
techniques received their share of attention. Pit-
sburgh aircraft glass specialists worked closely
with Convair's engineers in determining the
Pittsburgh Safety Glass that best fitted the
plane's functions and operating characteristics.

When you have a problem involving aircraft
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MORRIS, 877, 700, 710, 720, 730, 740, 750, 760, 770, 780, 790, 800, 810, 820, 830, 840, 850, 860, 870, 880, 890, 900, 910, 920, 930, 940, 950, 960, 970, 980, 990, 1000



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HORIZONTAL FEEDING, 1000, 1200, 1400, 1600, 1800, 2000, 2200, 2400, 2600, 2800, 3000, 3200, 3400, 3600, 3800, 4000, 4200, 4400, 4600, 4800, 5000, 5200, 5400, 5600, 5800, 6000, 6200, 6400, 6600, 6800, 7000, 7200, 7400, 7600, 7800, 8000, 8200, 8400, 8600, 8800, 9000, 9200, 9400, 9600, 9800, 10000



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MORRIS, 877, 700, 710, 720, 730, 740, 750, 760, 770, 780, 790, 800, 810, 820, 830, 840, 850, 860, 870, 880, 890, 900, 910, 920, 930, 940, 950, 960, 970, 980, 990, 1000



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MORRIS, 877, 700, 710, 720, 730, 740, 750, 760, 770, 780, 790, 800, 810, 820, 830, 840, 850, 860, 870, 880, 890, 900, 910, 920, 930, 940, 950, 960, 970, 980, 990, 1000



MORRIS, 877, 700, 710, 720, 730, 740, 750, 760, 770, 780, 790, 800, 810, 820, 830, 840, 850, 860, 870, 880, 890, 900, 910, 920, 930, 940, 950, 960, 970, 980, 990, 1000

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NEW AVIATION PRODUCTS



at 270 rpm. The light's capacity to take the crank-thrope movement is "surprising when it is realized the 100 rpm limit is a surprising one to believe the 'moving parts'." Westinghouse says.

The Sincro unit has sections that form three sides of a rectangle, with each corner rigidly braced. Westinghouse Electric Corp., 461 Liberty Ave., Pittsburgh 30, Pa.

Stand Spin-Tests Jet Assemblies

Stands for spinning jet engine assemblies to determine their mechanical condition and vibration characteristics are being produced in several models by Western Iron Mfg. Co.

The equipment will spin turbine rotors, low speed, compressor rotors, accessory shafts and other rotating parts at the engine's higher speeds than they normally encounter in service. Models include a spin jet, control panel and motor cabinet.

The largest stand, in which the spin jet is built in concrete up to the top cover, can take an assembly weighing 2,500 lb. and measuring nearly 5 ft. in diameter and wheel at 25,000 rpm. Smaller sections can be tested up to 100,000 rpm.

Parts to be tested are mounted in a balanced rotor, which is in the spin jet's cylindrical drum. A turbine drum, either stress or air driven, is mounted on the top cover. Air is circulated from the drum to reduce heat due to air friction.

Test operations are carried out from desk-shaped control panel which is equipped with pressure gauges, electronic frequency meter, vacuum pump and high speed control switches also are included here for a magnetic clutch for the test assembly and for the test drum. The service cabinet houses vacuum pumps, turn drive motor and control.

Western Iron Mfg. Co. of Western Brothers Road Co., Cambridge, Mass.

Helicopter Light

An incandescent lamp has been developed by Westinghouse Electric Corp. which has its filament housed in a room without any air circulation up to 200°C.

The lamp is used as a leading light on the tip of a helicopter blade which swings the bulb through a 90-ft. circle



Contour Machine

EnCellCo, maker of jet engine production equipment, has produced a precision vertical contouring machine.

The tool is designed for fast, accurate machining of large, round parts such as jet engine compressor wheels. Form tools in Style 420A, the machine is capable of precision contouring, boring, turning, facing, grooving and slotting. Simple controls enable an unskilled operator to turn out accurate work, EnCellCo claims.

Both horizontal and vertical movement in comparing operations is controlled by a travel finger that follows a form on a hardened, ground flat steel template. The finger is carried on the horizontal member of a two-level compound slide on the machine.

Both vertical and horizontal members of the right-hand compound slide are actuated through ground lead screws driven by variable-speed motors. Electronic controls keep feed per revolution constant throughout the cut regardless of variations in the contour or table speed, EnCellCo says.

A left-hand compound slide consists of a vertical shaft, supporting a horizontal tool slide, both hydraulically operated. The vertical slide provides loads for turning, boring and slotting. Facing and grooving done during the feed stroke of the horizontal slide forces automatic cycles are possible on the left-hand compound slide. Normal

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machine cycle includes operation of both constant speed in sequence. BuCoCo Corp., 1380 Oakwood Blvd., Detroit 12, Mich.

Precision Power For Computers

A new, highly precise, high-power d.c. source, designed especially for the existing requirements of digital and analog computers, business machines and other complex electronic devices, has recently been developed by Test, Inc., Los Angeles, Calif.

Known as the Precision Power Sup-

ply, the unit has a degree of performance registered by the maker as unprecedented, and is expected to have major influence on the future design and application of many types of electronic equipment.

The responsive amplifier/rectifier unit power supply has been developed in order to simplify design and ensure efficiency and reliability of equipment requiring very closely regulated direct current.

Test engineers claim that extensive tests demonstrate the unit's performance. It provides dynamic regulation of better than 0.1% with wide load and alternating current line changes

without voltage regulation power to be less than 0.15% above no-load and 100% load, with plus or minus 10% ac line voltage. Kerosene can be filtered as low as 0.01%, with 0.1% as standard.

The Precision Power Supply is said to require about half the space of many types of equipment with comparable performance, and is housed in a single compact cabinet, or can be built with dimensions to customer's specifications.

The unit is designed for trouble-free service, with no moving parts or electronic power tubes. The selenium rectifier/magneto amplifier design also makes it suitable for operation. Thus, the equipment is designed to require the minimum of maintenance and part replacement.

Because of its high efficiency of approximately 75%, the unit has sufficiently cool operation to reduce refrigeration requirements in office-installed computers, Test says.

L. B. Seitz, Test research chief, who supervised the development of the unit, points out that a computer is activated by "spikes"—extremely rapid surges in drops in voltage—and if therefore can not function properly if the power supply creates external spikes because of changes in the load or in the a.c. line. The instantaneous dynamic regulation of the new Precision Power Supply eliminates bulky and inefficient compensating elements which have previously been required in computers and business machines, he claims.

Standard ratings of the Test Precision Power Supply range from 6 to 500 v d.c., and from 5 to 250 amp. The equipment also can be built with other ratings to suit customer's specifications.

Test, Inc., 5655 So. Main St., Los Angeles 5, Calif.



20-MML CANNON MOUNT

Inspired war mount for 20 mm, cannon is designed for easy access to tonight's night vision. These proved alignment of gun as mounts and versatile with ordinary cameras. Release handle on the handle is required to remove gun. First units are being delivered to Lockheed Martin at Lockheed Douglas Co., Inc., 2916 Nebraska Ave., Santa Monica, Calif.



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At the height of the Comsat controversy, we are surprised to find as late Nov. 30 that that same disagreement may be known in America over completion of the Comsat is echoed by *Pro American*.

Between countries which enjoy the respect and confidence of each other and where there will be no divergence of national law as to the seriousness of a vehicle which has violated all the technical requirements of the official authorities, no other reason

Any different attitude would amount to an expression of want of confidence in national ability to take care of the safety of the teaching public, and it is unthinkable that any nation in the world can doubt British ability, or set its confidence of experience, as the basic standard of civil life.

The lobby in Britain is that the Civil Aeronautics Administration of the United States, locked in public American opinion, accepts this fundamental principle. If there should be expressions against basic American convictions of the Council, we know that they cannot be general and must be founded upon the facts of the situation as unambiguously interpreted.

These two are thoroughly well known to all concerned. The Council has not been allowed special proceedings in regard to establishing new standards of the British Air Registration Board. These standards are as high as any in the world. The volume and length of experience with jet engines and jet aircraft in England, and with other operations since 1970, and quantity and quality of personnel since 1954, founded upon the great heritage of engineering achievement in Britain, since the beginning of the industrial revolution, will be obvious to any competent observer. The establishment of test requirements by the ARB in whose work on jet engine standards commenced in 1946.

Since Comet flight trials began on July 27, 1949, the Comet I has been selected for the whole schedule of the AEC trials at England and as the tropics and has been found a safe and satisfactory test the public service. Accordingly, a British Certificate of Aeronautical was awarded on June 22, 1952, after no less than two-and-a-half years of test flying, route proving and crew training.

The type has been in public service since May 2, 1952, and by now has satisfactorily flown the more than 100,000 hours in its various modes of the airways network. Canada is at present flying more than 22,000 miles a week.

There could never be as England the slightest reluctance to cede a territory as worthy as American soil which had the history of a struggle to support our business would be regarded here as a slight on American strength and on our safety. "There would,"

All the experience to date in the operation of jet-powered passenger aircraft has

here. Bench experience. In volume and in technical performance it has been shown that it is adequate to establish the Comat for world wide service to world accepted standard sets of metric values.

That fact is well recognized in all circles in America. If accepted officially, it can be implemented without difficulty. Indeed, if it were not accepted, first our United States carrier could over purchase the Canal; 2, because the purchase must be made a year or two before a Canal 3 could be authorized for study to study the American installation requirements.

[illegible]

M. Stuart,
Public Relations Manager
De Havilland Aircraft Co. Ltd.
Horsfield, Hertsfordshire,
England

Your statement on "Why So Many Missed U.S. Approaches?" in a recent *American* story which says "It missed a number of chances

likely requires the removal of the benefits of approach, albeit at additional burden on the local traffic system, and entails a difficult go-around maneuver under instrument flight conditions," is very misleading.

"Miscon approach" is probably one of the most misapplied word known in aviation, and elsewhere: it used in an attempt to degrade the ability of the airline pilot.

bermen, in the mood of the pilot, should the approach be continued at the prescribed low altitude it would entail an unsafe opening of the canopy. Whatever the causes for the decision to abandon the approach are, the decision is still made by the aircraft commander.

It is recommended in your article that pilots should continue a little after they are doubtful as to the entrance of the approach, so the hope that will see some there, and then a solid engine, a run, a

exercised down near the ground in order to land successfully. Nothing makes the principle "happen" due to light forces in actual flight while approaching an object and then expensively the "fall" of heavy



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AVIATION SAFETY

CAB Accident Investigation Report

Cargo C-46F Crash Near Idlewild

Investigation discloses that probable cause of the January 3, N.Y., crash of a USAF C-46F loaded to U.S. Army, Inc., was undue engine failure caused by deteriorated fuel tank diaphragm. Pilot, copilot and three persons on the ground were killed.

Here is CAB's official report:

THE ACCIDENT

A C-46F, serial 14121M, owned by the United States Air Force and operated under lease to U.S. Army, Inc., crashed at Idlewild, N.Y., on Apr. 3, 1973, at about 0827⁰⁰. The aircraft, with 10 persons on board, was killed as were three persons on the ground. Five other persons were injured, four buildings were destroyed, several automobiles were damaged, and the aircraft was destroyed by impact and subsequent fire.

HISTORY OF THE FLIGHT

The flight was designated as No. 42 because it was being operated as the second section of a regularly scheduled cargo flight to Fort Lauderdale, Fla., on Apr. 4. Flight 42 departed Fort Lauderdale, Apr. 3, 1973, at 0805, with a main destination of Cape William B. Crotwell, Jr., and Co., Inc., Fort Lauderdale, Fla. The destination was later changed to Fort Lauderdale, Fla., and the aircraft was operated as a cargo flight.

The flight was operated by the United States Air Force, and the aircraft was operated by the United States Air Force. The flight was operated by the United States Air Force, and the aircraft was operated by the United States Air Force. The flight was operated by the United States Air Force, and the aircraft was operated by the United States Air Force.

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and five miles with heavy rain upon arrival. At 0914 the crew filed a flight plan according to instrument flight rules to cross from Raleigh-Durham to New York (actual estimated arrival) (filed) at 1000 feet. The original destination, Teterboro, was changed because of weather conditions, and the aircraft was diverted to Idlewild International Airport. The estimated time en route was two hours and ten minutes.

The aircraft cleared Idlewild on arrival. The flight was operated by the United States Air Force, and the aircraft was operated by the United States Air Force. The flight was operated by the United States Air Force, and the aircraft was operated by the United States Air Force.

Upon departure from Raleigh-Durham at 0808 the aircraft's gross weight was about 372 pounds less than its maximum allowable of 45,000 pounds with its tanks of gasoline was within permitted limits. The flight proceeded uneventfully at its planned altitude of 3,000 feet. Enroute position reports were made through the New York terminal and airport over the Idlewild radio station was estimated at 0910. At 0910 the flight was followed by ATIS (see Route Traffic Control) to climb to 3,500 feet to contact Idlewild Approach Control when over Southfield Intersect (where the north-west leg of the Idlewild airport intersects the south leg of the Newark airport).

The next instruction to the flight was from Idlewild Approach Control and 6 minutes later to hold at Southfield at 3,500 feet and to expect approach clearance at 10:00. The flight reported over Southfield at 10:00 and at 10:07 immediately following, the flight was given 10:00 weather as follows: "Weather 10:00, June 0817, scattered 500 to 600, broken 1,000, overcast, visibility 1 1/2 miles in heavy rain, the altitude 3500."

The approach controller had the flight on the report surveillance radar (ASR) when it was approaching Southfield. He noted the flight at 10:00 and it was 10:00. The flight reported over Southfield at 10:00 and at 10:07 immediately following, the flight was given 10:00 weather as follows: "Weather 10:00, June 0817, scattered 500 to 600, broken 1,000, overcast, visibility 1 1/2 miles in heavy rain, the altitude 3500."

The flight was operated by the United States Air Force, and the aircraft was operated by the United States Air Force. The flight was operated by the United States Air Force, and the aircraft was operated by the United States Air Force.

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call now by coming up on the Federal Building. Go ahead and you'll probably be next at the Federal Building when you call. This was acknowledged by the flight, which immediately attempted to comply. The message was not repeated.

At 0917 the lead controller saw the aircraft below the summit and at an estimated altitude of 900 feet, between the tower and Runway 4. He at once instructed, "Just now you are over the airport. You should be positive about location. Now I now start your left turn and watch the runway on your left wing, you'll be able to make a left turn into Runway 4. (The tower controller) The landing area approach is to be fully extended, but the flap position was not noticed.

The aircraft's approach below the summit differed from view on a southerly heading and still at an estimated altitude of 500 feet. The lead controller at once noted the flight at 10:00 and it was 10:00. The flight reported that it was pulling up to attempt a missed approach. The tower gave immediate instructions to turn right and proceed to Long Beach International, the GA leg of the Idlewild Runway and the SW leg of the Runway 4, about 10 miles SE of Idlewild at 1,500 feet altitude. The instruction was relayed to the flight. This was the last communication from the flight. A very short time later the aircraft crashed at the intersection of 145 St. and 51 Ave., Idlewild, N.Y., about 1/2 mile north of the Idlewild control tower.

INVESTIGATION

The altitude of the aircraft during its final approach was determined by observation of its path in the postmortem approach video (PAP, or previous report). Unlike the previously mentioned ASR which does not indicate altitude, the video indicated this, direction in altitude, and distance.

It appeared that the flight in sight on the scope when it was about three miles from the runway. He saw it level out at an altitude of about 900 feet when it was about 1/2 mile from the runway. The flight was operated by the United States Air Force, and the aircraft was operated by the United States Air Force. The flight was operated by the United States Air Force, and the aircraft was operated by the United States Air Force.

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terribly close to the crash site. Only a few of these 10 persons saw the plane, and they saw it only for a very short interval of time. At 7:59, however, fatal moment came.

None of these witnesses was further concerned at the public hearing at connections with this accident. The witnesses of their testimony, as well as that of witnesses who did not testify, indicates that both engine and visibility were close to zero, and that man was falling at the time and place of the accident. It also indicates that when the aircraft was first seen by flight below the ground, it was in a steep right bank and descending rapidly.

Testimony also indicates that engine noise diminished, came on with an extremely loud roar immediately, again diminished, and came on again with a similar extremely loud roar, whenever impact occurred. The aircraft was in an elevation approximately 110 feet higher than Midwest Airport.

Investigation also determined that at the time of impact the gross weight of the aircraft, based on its completed weight, again departure from Raleigh Durham and on the 100 fuel load, was approximately 45,750 pounds. This was 2,210 pounds less than its certified gross weight of 47,960 pounds. The amount of fuel on board at the time should have been enough for about one hour and 40 minutes of flight.

The through cargo was of miscellaneous materials and totaled 11,500 pounds. Tens of thousands of people loaded the aircraft at Fort Lauderdale indicated that this cargo was properly secured. The carrier's operations manager testified that he had never noticed aspects of cargo shifting in flight.

In regard to the weather situation, from the capture of 17 flights that took off from or landed at Midwest during the period from one hour before, until several hours after, the time of the crash indicated that the weather was substantially as reported and that no balance existed. This turbulence was not described as being "light" or "severe" from the surface up to the 1,000-foot level. These pilot reports also indicate that all radio facilities at Midwest were functioning normally during the event. In this connection, all radio aids at the airport were checked by CAA as soon as possible, all were found to be operating normally.

The crash landing occurred at the airport when the flight passed over was probably slightly below the carrier's 500-foot minimum. An observation started at 6:17 was completed and transmitted to the control tower by teletypegraph at 6:26. This was to be the Weather Bureau 6:25 sequence and indicated a 400-foot measured ceiling and a visibility of two miles. A careful study of the true factors involved indicates that a wreck may have been feasible, and perhaps not desirable, to kill this in the month which was then (at 6:25) approximately over the airport.

An examination of company flight records

*This flight, recorded, showing gross weight and of Raleigh Durham, it is shown that the aircraft was 110 feet higher than that given in the company at Miami. The flight manifest gave destination from Fort Lauderdale was primarily flight log and the one showing gross weight out of Charlotte was recorded and noted.

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of parts uniformly used during an inspection.

[6] The engine would function regularly, and after completely all the disassembled in the position of main parts in room.

The left engine had only been in use for six hours and fairly low number of hours had been checked. Investigation disclosed that this engine had been out of use after installation at the start for a period of 17 months by the chief pilot for U. S. Airlines and to his satisfaction.

The propeller pitch setting of the left engine was determined to have been approximately 17 degrees at the time of inspection. The right propeller was found to have been set at a pitch angle of 17 degrees at the time of inspection.

Investigation further disclosed that the left engine had been overhauled for U. S. Airlines by the Air Carrier Engine Service, Miami, Fla. (ACES), a certified engine overhaul station. The discrepancy in question is an integral part of the engine and not of any accessory, and was supposedly installed by ACES at the time of engine overhaul.

Replacement of this discrepancy a secondary during engine overhaul, which for the service as reported at present of 900 hours in use of operation. Concluding of the maintenance employee of ACES who worked on that portion of the engine at the time of overhaul was to the effect that he could not remember replacing a new discrepancy on the subject engine, but that he had never failed to install new discrepancy on all engines that he had worked on. ACES shop members of overhauling engine calls for, first, a complete disassembly of the engine.

All parts are then placed on a rack, and checked by inspection in "disassembly rack" (the trade name of a company and disassembling shop). Person parts are then again inspected, washed, placed on a rack, and sent to the inspection department. This inspection handles only the engine overhauling the engine containing the defective discrepancy. An effort of ACES stated that he company had never checked the discrepancy of the subject type and part number.

The discrepancy is some two inches in diameter and of solid, metal with synthetic rubber. It is fastened to the engine intermediate part and by a metal screw secured by its shorter head screw. This screw was permanently disassembled (displaced) at all six screw holes so the screws had been tightened externally. The cover shell bore no sign of heat. Close disassembly of the screw could have contributed to, or possibly precipitated, failure of the discrepancy.

ACES received this engine on Jan. 1, 1952, for overhaul. Following the work the engine was block tested for five hours and the exhaust and propeller finished on Feb. 1. No abnormalities were noted. The engine was then transported to the carrier's base on Mar. 28, 1952, and installed in N 241M on Apr. 4, 1952. In order to compare with the discrepancy a metal plate, installed on the one used for production during transportation, would have had to have been removed.

Continued of personnel of the carrier was to the effect that neither discrepancy was



Internal oil-sealing shaftless — example of measuring inside diameter to 1/32 inch with oil-seal.

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5. INTERCHANGEABLE PARTS

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for the installation of a new Edison temperature indicator in the dash area of the ship. Personnel at AGES indicated that the company had never installed a duplicate of the subject type and just wonder. As it made sense, the Bureau of Standards' tests indicated that in connection of a major new development in aviation but the LEON hours that this is known to Keros & Korb, which was the agent studied and used by AGES, would demonstrate a new duplicate in a new design subsequently the same is that of the failed duplicate in question.

At the time for overhaul for the subject engine was 915 hours, it must be concluded that the duplicate in question had been in use, i.e., exposed to fuel for the period of time, had not been removed, was unremoved in a changing agent, and got back in the overhauled engine.

Although AGES company officials testified that such serious could not possibly happen because of their shop methods, the Board finds that the duplicate in question was not replaced at the time of engine overhaul, and that in deteriorated condition as found was due to its having been replaced in previous service and to the action of the "Keros & Korb" report. It is quite obvious that had a new duplicate been installed, its condition could not have been reduced to the state of the one involved during its 100 hours of engine use.

FINDINGS

On the basis of all available evidence, the Board finds that:

1. The engine, the aircraft and the crew were properly certified.
2. The flight was properly dispatched and cleared and was within legal limits under the flight plan.
3. At the time approached 1000 ft it was given the best weather including a maximum ceiling of 700 feet and a visibility of one and one-half miles.
4. This engine and visibility was the minimum for the subject flight.
5. The report received as to follow the crew's suggestions due to limited forward visibility at low altitude.
6. During engine operation for a period approach the fuel tank valve duplicate of the left engine either completely failed or its fueling failure became worse, the duplicate had not been replaced at the time of engine overhaul, as required.
7. The left engine then shut down gradually with engine automatically cutting out.
8. At the time the flight was on a steep climb to 1000 ft.
9. Control was lost and the aircraft descended rapidly as a result of the fuel tank valve duplicate of the left engine either completely failed or its fueling failure became worse, the duplicate had not been replaced at the time of engine overhaul, as required.

PROBABLE CAUSE

The Board determines that the probable cause of this accident was loss of control following engine engine failure, caused by a deteriorated fuel tank valve duplicate of the left engine either completely failed or its fueling failure became worse, the duplicate had not been replaced at the time of engine overhaul, as required.

BY THE CIVIL AERONAUTICS BOARD:
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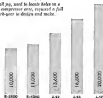
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Everyone concerned with aircraft production knows that a modern military airplane is more complex than its World War II counterpart.

But how many, we wonder, realize how much more complex it is?

For instance, take the engine, the heart of any aircraft. As just one measure of how problems have increased in powerplant development, we show above the number of special tools, jigs, dies and fixtures required to produce various Pratt & Whitney engines to the point at which they passed their 150-hour type tests.

Each of these tools had to be designed and made—and made to work—before the engine in question could itself be manufactured. There were 10,000 such special tools required for the R-2800, one of the most powerful piston engines of World War II. Today, 20,000—just twice as many—are required for the J-57 Turbo-Wasp!

While tooling is only a single phase of jet engine production, it illustrates the complexity of the entire industry's problem. It also helps demonstrate why—today as always—dependable engines take time to build.

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AIR TRANSPORT

CAB Holds Key to Future Airline Profits

- Carriers earned nearly \$55 million last year.
- But rate probe may set future profit margins.

By Lee Moore

Future profits of the airline industry are at stake in two regulatory proceedings now moving into high gear at Civil Aeronautics Board.

• **General Fare Investigation** CAB decision on passenger fares may affect vital profit margins of the domestic airlines. Counsel for the CAB, Bureau of Air Operations has set a Jan. 15 deadline for airline reports on their attempted revenue and expense, break-even load factors, and other data important to pricing of future passenger transportation service. Passenger fares are the major profit factor for domestic airlines because they no longer depend on mail subsidies.

• **Trans-Atlantic Mail Rate Case** CAB decision will fix final post and future mail rates for Pan American Airways Atlantic Division and Trans World Airlines international routes. Subsidy mail rates will remain the profit source on international operations for many years to come. But the setting of a final rate will put the airlines on their own to profit or lose by their own efforts with no recourse to retroactive charges.

Meanwhile, the consolidated eight domestic and international airlines probably will report 1952 earnings near \$55 million, about the same as 1951, financial observers predict. That is about a 9% return on invested capital.

Here is what AVIATION WEEK found through interviews with key CAB and airline officials about the current rate-making policy which will hinge on both the domestic fare investigation and Trans-Atlantic Mail Rate Case.

• **Argue Proper Profit Return**—The basic contention between airlines and CAB rate-makers will be whether to set domestic fares and international freight rates on the basis of "fair and reasonable," too high, or too low.

Airlines argue that today's airline business profits are temporarily inflated by loose credit policies and equipment shortages—and still aren't high enough. They say rates should be adequate to

• Buy new planes without increasing

Airlines' 1952 Return on Investment As Calculated by CAB Rates Division For 12 Months Ended Sept. 30

	Net Profit* (millions)	Return on Investment**
American	\$10,713	10.0%
Eastern	5,400	7.6
TWA	7,757	6.3
United	10,084	10.6
"Big Four" Average**		9.5
Boeing	257	2.2
Capital	1,287	10.1
C & S	1,137	13.3
Delta	7,089	10.8
Norfolk	1,920	14.0
Northwest	1,282	8.8
Western	1,130	11.4
"Middle Seven" Average**		9.1
Colonial	(- 518)	
Continental	271	7.5
Northland	(- 170)	
"Little Three" Average		5.0
15 Airlines' Average****		5.9
Passage	(- 49)	
Per Airline	6,492	5.0

Source: CAB Rates Division computations from Form 41 reports.

* Profit after taxes and interest payments. (For rate-making purposes, however, CAB figures profits before interest payments.) These profits exclude revenue from "non-transport" services.

** Investment allowed by CAB for rate-making in the "direct transport" category only. It excludes such investments as those in foreign subsidiaries, airports paid on equipment not yet put in operation, and other "non-transport" investments.

*** Average is figure in total profit divided by total investment of the group, not an average of individual rates permitted.

**** Delta 7 and Mid-Continent figures consolidated because of merger during 1951.

debt loads substantially. Debits are now about one-third of invested capital for the airlines, a CAB official says.

• **Coerce Future Airlines** in profit margin, inevitable because of airline competition falling load factors and distribution which occur in general business.

• **Other past lines of the 1946-49 air law departures**—Threading through all three of those arguments is the investment plus for what firms accumulate in airline business under past CAB rate-making policies—mostly indirect investments in airports and dead-end projects.

On the other hand, counsel for the Bureau of Air Operations, representing

the public, can be expected to make these counterarguments.

• **Airlines are financing new equipment** fairly steadily in the future, despite the gigantic size of their planned fleet expansion.

• **Low fares, or low rates** profit margins, broaden the market and may be better for long-run profits. But increasing fares is a boon and helping create a base. Also, CAB and the airlines have a responsibility to bring the lowest reasonable fares to the public. Airlines must accept the regulatory policy of exchanging for Board protection of their gains monopolistic route franchises, granted "in the public interest."

• **CAB did not guarantee profits** to air



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frequency rates are Pan American's Latin America Division, Bermuda, and Northwest International. Already operating in final mail rates are Pan American's Pacific Division, Panama, and Chicago & Southern.

► **CAB Policy.** Here is the CAB rate making policy on final subsidy mail rates.

First, CAB estimates future revenue and expense. Then the Board sets a subsidy mail rate intended to yield enough overall profit to the airline to give it a fair return on investment. Once a rate is set, it's up to the carrier to "beat" the final subsidy.

The CAB will be proud of its program to bring its goal of placing all major airlines on final rates. CAB believes the feasibility of this will prove a just incentive to the airlines to cut costs and hurry. When they were on temporary rates, incentive was lacking because of the probability of adjustment. Whatever the airline makes on the final rate, it keeps. There is no restrictive income or decrease to the rate.

When that final mail rate is set, CAB Board officials sit back and wait at least a year to watch profit returns. Even if a carrier makes a 20% return in the first year, CAB may not "re-open" the rate if there are signs that profit returns will not continue. Until CAB reopens the rate, all gains or losses are permanent.

If a company finally shows signs of definitely making money or inadequate profits, CAB or the airline itself may reopen the rate. When a new rate is fixed, it applies from the date of acceptance forward. The final rate is not subject to retroactive adjustment.

Estimating an airline's future income expense in the final mail rate hearings is the vital aspect of the case. Once CAB and airlines can agree close to

agreement on income forecasts, the rest usually is comparatively simple. When it comes to the question of how high profits should be, the CAB members do not appear ready to change their historic concept of around 5% during a long period perhaps slightly higher than the general house level.

When the team Atlantic and note a fixed, CAB studies airplane investment will find a much-improved situation in applying the outlook for TWA and Pan American earnings. They will be more like a non-regulated company, because attractive changes in mail rates will not threaten the rates of the investment.

Urges Airports Near Noisy Areas

One of the solutions to the transport plane noise problem is to locate air terminals in noisy industrial districts, thus making aircraft sounds less noticeable, says Donald C. Hardy, research chairman, aircraft department, American Research Foundation of Illinois Institute of Technology.

Dr. Hardy thinks there is little hope of eliminating the noise nuisance by redesigning aircraft engines in production. He considered these major problems:

- A low-engine plane taking off makes considerable difficult situation within two miles of the line of flight.
- The width of the area covered by disturbing noise is two miles from each side of the flight path up to about 10 miles from the airport. A four jet transport would double this width and would be annoying within two miles of the field.

Hardy advises against building a house within one mile of the runway flight pattern.



AA EXPANDES CHICAGO FACILITIES

American Airlines' new passenger waiting room at Chicago Midway Airport has eight ticket and baggage counters. Lobby space has been tripled. The carrier's expansion program at the field includes a 600-ft

leated passenger concourse capable of handling up to 100 aircraft simultaneously, and a new cargo transfer center. The \$300,000 program was handled by United Construction Co.

C&S-Delta Merger Gets Final Approval

Carl Ammann, Delta and Delta President Thomas have approved merger of Delta and Chicago & Southern, as reported in *American Week* (EWS 29, p. 48). One signpost before CAB will be Delta-C&S Airlines.

CAB did not oppose new route authorization on the combined system. Delta president C. E. Woolhouse became president and general manager of the new company. C&S chairman Carlisle Peterson becomes chairman of the board. Names of the new carrier will be Delta-C&S Airlines.

C&S president Sidney A. Stewart will be executive vice president, and those C&S directors join the Delta board. Headquarters of the organization is at Atlanta.

► **Mail Pay.** The combined line will be the largest domestic in terms of route miles—9,508, including the 1,820 mi. of California and Latin American routes of C&S.

The merged company will receive a subsidy of \$1 cents a ton-mile for mail per, except for the substantial international division. CAB estimates the merger will benefit revenue services of about \$250,000 a year, although the two companies claimed savings would be over \$1 million.

Caribbean flight includes 7 DC-6s, 6 Constellations, 1 DC-11, 29 DC-3s, 1 C-47, plus 10 C-54s, C-46s and 4 DC-7s on order.

Labor protection provisions within the merger by CAB are displacement and dismissal adjustment, and new rules on moving employees, including real estate adjustment.

Delta reported a 12% gain in passenger business in 1952, and estimates set 1953 profits at \$4,147,000 after taxes, double 1952's figure—\$1,947,225. Chicago & Southern estimates its 1952 profit was higher than 1951's: \$1,134,956, with revenue up 21% to more than \$15 million.

Airliner-Lightplane Crash Hearing Held

A Carl Ammann Board accident hearing was held last week at Rockwood, Ind., on the Lake Central DC-3 collision with a low plane Cessna three last month. Sherman Crain, general manager of the Crown Aircraft Helicopter Division who was flying the lightplane, was killed.

The planes hit a few feet in the air at the uncontrolled airport while landing in different directions under one windward condition. C&S and Air Line Pilot Association officials, meanwhile, are trying to develop a better system to

prevent the danger of in-flight collisions at uncontrolled airports.

One such proposal is a flag to warn airline pilots when other aircraft are in the area. Another is designation of VFR frequencies for pilots to plan self-control of airports having tower communication facilities.

JAL Plans Flights To San Francisco

Japan Air Lines, reporting a government franchise soon for operation on international routes, plans to outfit presently DC-6 service Tokyo-San Francisco in April or May.

The Japanese government already has issued JAL about \$5.5 million and is hoping for World Bank aid to support further needs of the carrier.

The Japanese airline is negotiating in Washington for permission to route from Pacific flights to San Francisco and official U.S. consent is expected.

The airline is to be owned wholly by Japanese, who gradually will replace American pilots supplied by leased American Air Lines. Of 2,000 Japanese management pilots trained, JAL has picked 40 former DC-3 pilots and is training them at the airline's home base and at Transwestern facilities in Oakland, Calif.

► **Completing Program.** Japan Air Lines is completing purchase of two DC-6s for this country for the San Francisco service. The carrier now operates an



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Stirling W. Conner, Jr., Eastern Air Lines captain based in New York City, is now executive vice president of Air Line Pilots Assn. Active in ALPA's early years, Capt. Conner has served as council chairman, chairman of the Motion Picture Council, chairman of negotiating committee and is a member of various other committees. He remains in New York City.

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EDITORIAL

More Reforms Needed at CAA

We congratulate Civil Aeronautics Administrator Charles H. Hensley for transferring William B. Davis from an important post in the Washington office of CAA to a more benign one in the Kansas City region. The move comes a year later, but at least it is in the right direction, although Mr. Davis temporarily retains his Grade 13 Civil Service status and salary. (Story on p. 16).

Mr. Davis has been deputy director of the vital Office of Aviation Safety. With his chief, Ernest Hensley, he has been a stern critic since they succeeded a notorious and easily "manipulated" CAA safety office only last year. In the process, several well-respected CAA public servants were banished to the sticks—as Mr. Davis, a being launched now—and other cronies of Messrs. Hensley and Davis were elevated to jobs that were too big for them. We hope someone does something about these misfortunates before long.

Reasons are urgent that Mr. Hensley is looking for quarter regions, too. For his sake, and that of aviation safety, we hope so. There are reports that Leonard Ashwell, deputy chief of the Air Carrier Division of OAS, may replace Hensley. But the Eisenhower Administration may inherit this decision.

We hope Gen. Eisenhower will give CAA a close scrutiny and a strong Administration.

The close scrutiny should take in the present so-called "regional" organization structure. This was sold to a previous Administration under the guise of "decentralization." It has long since become clear to most of us that this setup, far from constituting decentralization, is actually centralization in 11 headquarters instead of one.

What was intended to be small, decentralized "house keeping" regions have become 10 colossal empires, each a separate CAA in itself, complete with administration, dispatch administration, aircraft administration, executive assistance, planning and procurement offices, and so forth, with salaries of \$10,000 and above, grossly scattered over the countryside.

These 10 separate CAAs frequently place different interpretations upon Washington instructions and policies, and for the result that safety standards, procedures, and the like vary widely between and among regions. For example, the First Region assigned The American Airlines Division to airline navigation on flights between New York and San Juan, while the Second Region authorized the same airline's Latin American Division to fly the same route with the same aircraft with out navigators.

The Sixth Region authorized airlines headquartered in that region to use commercial radio broadcasting stations for navigational and instrument landing facilities while other regions denied airlines headquartered in their regions the right to use the same stations for the same purposes.

One region will authorize an airline to fly into an airport when the weather is 200 ft. ceiling and one-half mile visibility, while another region will insist that their airlines operate into the same airports with weather

minimums of 300 ft. ceiling and three-quarters-of-a-mile visibility. So it goes.

Controversies arising subsequent to such differences are seldom settled because none in the CAA except the Administrator has any real authority—technical or otherwise—over a regional administrator, and no Administrator could become familiar with the details of all such disputes which occur during their comparatively short tenures in office.

The airlines as a group made strong objections to former Administrator Wright and Reindel to take airline inspection out of the regions. Both were sympathetic but were persuaded by the regional administrators that the ins complicated of could and would be rectified by the "inspections," which, while accomplishing the desired ends, would still retain regional "integration."

These "inspections," with many recommending references to "system-wide" air-carrier inspection, were strictly lip service and coveralls, assumed and inspected CAA people tell us, and the Civil Guard kept their tight grip on airline inspection and kept it divided among their regions. They also kept it married, in the shotgun manner, to the old General Inspection crew, because that made it possible for the clique to keep their stonies in the top supervisory positions whether or not they have any background experience or talents which qualify them to "supervise" airline inspection.

Under Messrs. Hensley and Davis, neither of whom knows anything about modern airline operation or inspection, the situation has grown steadily worse until the whole CAA is floundering in its own old tape, confusion and ineptitudes.

It is a sad but that lip service and "accommodation" will no longer suffice to quiet the naggy protests, and that active inspection will soon be divorced from regional boundaries and regional representation—and from Messrs. Hensley and Davis.

Men in the airlines and CAA whom we expect believe that one high-caliber inspector should be placed in full charge of the inspection of each airline, and that his assistants, stationed where he needs them, will work solely for and report directly to him. He, in turn, will report to one man at CAA headquarters.

And they say that airline inspection is sufficiently important to be set up directly under the Administrator, with no third layer of authority between.

The whole concept of airline inspection, these men say, should be changed from the Hensley-Davis neo-lightened, stereotyped, paper-drafting variety to a real one and intelligent manner of actual inspection of vital safety functions.

A small, integrated group of qualified individuals with direct line of authority and responsibility, guided by a minimum of clearly stated standards and policy, could soon dispel the confusion and put an abrupt end to the conflicting and back-peddling so prevalent among and between the 10 regions and their insupportable strata of "supervisors" who accept responsibility for nothing, yet have authority over everything.

—Robert H. Wood

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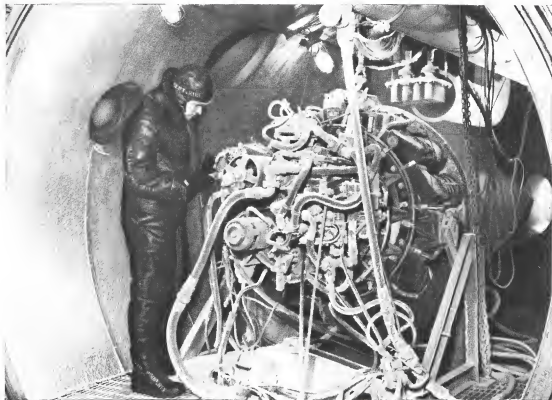
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